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ABSTRACT

A study was done (1) to derive a revised set of attribute-requirement weights for the 622 work elements (descriptions of work activities and conditions) contained in the job-rating instrument, the Occupation Analysis Inventory (OAI), on the 103 human attributes descriptions (cognitive, psychomotor, and affective) in the Attribute Requirement Inventory (ARI) and determine their reliabilities, and (2) to derive a stable set of attribute-requirement estimates for a sample of 1,414 jobs using the revised weights in combination with OAI job ratings. Estimates of the requirements of the OAI work elements for the ARI attributes were obtained from fifteen judges, with each OAI work element receiving ten ratings on each of the ARI attributes. Both study objectives were realized. Substantial reliability coefficients were obtained for the attribute-requirement weights of the OAI work elements, and the reliabilities of the attribute-requirement estimates for jobs were moderate to high. (The appendix includes the rating instructions and a list of the ARI attributes, indexes of individual-group agreement for judges, attribute-requirement weights for OAI work elements, reliability estimates for the attribute-requirement ratings, titles and codes of the jobs included in the reliability analyses, and reliability coefficients of attribute-requirement estimates.) (Author/EM)

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A SYSTEMATIC PROCEDURE FOR ESTIMATING THE HUMAN ATTRIBUTE REQUIREMENTS OF OCCUPATIONS

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J. W. Cunningham

Department of Psychology

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The research reported herein was performed pursuant to a grant with the National Institute of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official government position or policy.

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Report No. 11 of the Ergometric Research and Development Series

Program Director: J. W. Cunningham

CENTER FOR OCCUPATIONAL EDUCATION
North Carolina State University at Raleigh

1975

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J. W. Cunningham, Program Director

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(2) There is an established technology, "ergometrics" (or quantitative activity analysis), that can be used in gathering and organizing information about the domain of adult activities for educational development purposes.

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ABSTRACT

An effort was made to further develop the linkages between a comprehensive set of work elements describing different kinds of work activities and conditions and a set of defined human attributes in the cognitive, psychomotor, and affective domains. The purpose of the reported study was twofold: (a) to derive a revised set of attribute-requirement weights for the 622 work elements in the Occupation Analysis Inventory (OAI) on the 103 human attribute descriptions in the Attribute Requirement Inventory, and determine the reliabilities of the resultant weights; and (b) to derive a stable set of attribute-requirement estimates for a sample of 1414 jobs, through application of a "job-component" procedure combining the jobs' ratings on the OAI work elements with the elements' weights on the various human attributes. Both objectives were realized: substantial reliability coefficients were obtained for the attribute-requirement weights of the OAI work elements, and the reliabilities of the attribute-requirement estimates for jobs were moderate to high. Research and development applications are discussed. The attribute-requirement weights for the OAI work elements are appended.

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INTRODUCTION

The present study was part of an Ergometric Research and Development Project directed toward the development of a quantitative occupational taxonomy applicable to occupationally related education and guidance.

The Ergometric Project began with the development of the Occupation Analysis Inventory (OAI), containing 622 "work elements" (descriptions of different types of work activities and conditions) on which jobs and occupations are rated (Cunningham, Tuttle, Floyd, and Bates, 1971). The OAI work elements were generated within the broad framework of an information processing paradigm (see Figure 1) whose components were subdivided according to selected conceptual frameworks pertaining to human behavior and work technology; the work elements were constructed within the resultant subcategories. The completed instrument represented an attempt to achieve as much specificity (or content loading) in occupational description as possible, while retaining applicability to the entire occupational spectrum. The OAI was thus conceived

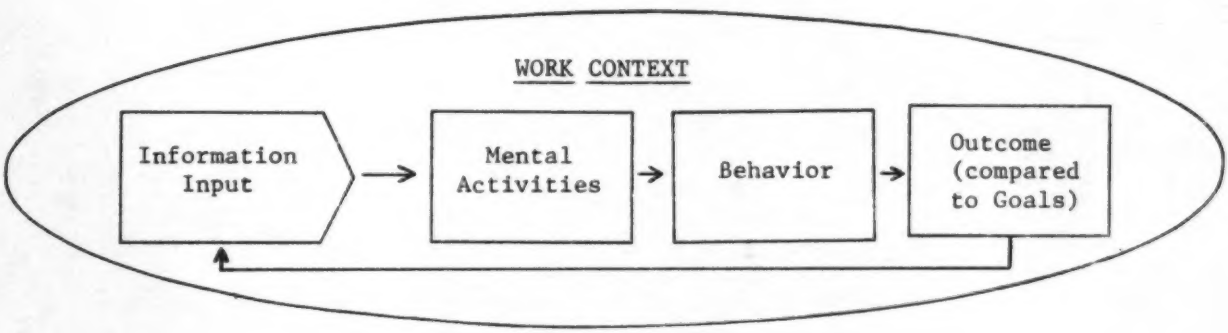

Figure 1. Paradigm for the Occupation Analysis Inventory (OAI)

as ". . . an instrument which pushes the limits of general applicability; that is, an instrument that falls near a specificity-generality threshold separating general descriptive devices from devices designed for restricted categories of jobs and occupations" (Cunningham et al., 1971, p. 5).

To date, 1414 jobs have been rated on the OAI, and the rating data have been subjected to a series of factor analyses which have reduced the 622 OAI work elements to a lesser number of work dimensions, or factors (Riccobono and Cunningham, 1971a, 1971b; Boese and Cunningham, 1975). In the last factor analytic study, eight separate a priori sections of OAI work elements were subjected to factor analyses which yielded a total of 132 rather specific first-order factors, or work dimensions. For the purpose of combining all sections of OAI elements, 128 of the first-order factors were, in turn, subjected to a single factor analysis which produced 28 orthogonal higher-order factors. In general, both the first- and the higher-order work dimensions were meaningful and stable (as determined by Tucker's coefficient of congruence). It is believed that the OAI work dimensions will prove useful in the description and classification of jobs and occupations (and possibly occupationally related curricula), and in occupationally related test development. A recently completed study has demonstrated the utility of the OAI work dimensions as profile variables in the derivation of an occupational cluster structure (Pass and Cunningham, 1975).

Since the OAI was designed to analyze and describe jobs in terms relevant to human behavior, it was considered both desirable and feasible (in terms of existing technology) to link the OAI work elements to defined human attributes in the cognitive, psychomotor, and affective

domains (i.e., to selected abilities, interests, and needs). Accordingly, the project investigators identified and defined 103 human attributes for which there were existing tests or inventories in the three domains. Estimated requirements were then established for each OAI work element on each of the 103 human attributes, according to the job-component (or synthetic) procedure developed by E. J. McCormick at Purdue Univeristy (McCormick, Cunningham, and Thornton, 1967; McCormick, Jeanneret, and Mecham, 1972; Neeb, Cunningham, and Pass, 1971). The derived linkages between the OAI work elements and the 103 measurable human attributes expanded the capability of the OAI; based on those linkages, the OAI could provide estimates of a job's requirements for the aforementioned human attributes, as well as a description of the activities and conditions (in terms of work elements and dimensions) involved in the job. Two subsequent studies provided some support for the construct validity of the OAI-based attribute-requirement estimates for jobs and occupations by demonstrating significant relationships between those estimates and the ability, interest, need, and satisfaction scores of incumbents and graduate trainees in occupations that were rated on the OAI (Bates and Cunningham, in press; Tuttle and Cunningham, 1972).

The study reported here was designed to further develop the linkages between the OAI work elements and the previously mentioned 103 human attributes in order to improve the stability of the attribute-requirement estimates for jobs and occupations that are rated on the OAI. It is believed that stable and valid estimates of the human attribute requirements of jobs, occupations, and occupational clusters, and perhaps occupational curricula, could prove useful in occupationally related education and guidance (Cunningham, 1971; Cunningham et al., 1971).

PURPOSE

The primary purpose of this study was to gather additional attribute-requirement data for the OAI work elements in order to increase the reliabilities of the attribute-requirement weights for those elements. Any increase in the reliabilities of the attribute-requirement weights of the OAI work elements should, in turn, lead to an increase in the reliabilities of the synthetically derived attribute-requirement estimates of jobs and occupations rated on the OAI.

The specific objectives of the study were to:

(1) obtain ratings on the requirements of the OAI work elements for 103 defined human attributes in the cognitive, psychomotor, and affective domains;

(2) employ the combined attribute-requirement ratings obtained in this study and in a previous study by Neeb et al., to derive a requirement weight for each OAI work element on each of the human attributes (in most cases, the weights were based on mean ratings);

(3) perform analyses of variance on the attribute ratings in order to obtain reliability estimates for the attribute-requirement weights of the OAI work elements;

(4) following McCormick's synthetic (or job component) procedure, derive the estimated requirements of 1414 OAI-rated jobs for the 103 human attributes;

(5) perform inter-rater reliability analyses of the attribute-requirement estimates for jobs, based on multiple OAI job ratings.

PROCEDURES AND RESULTS

As mentioned, McCormick's synthetic (or job component) procedure was used previously in the Ergometric Project to derive (a) attribute-requirement weights for a comprehensive set of work elements and (b) attribute-requirement estimates for jobs that were rated on those work elements (Bates and Cunningham, in press; Neeb, Cunningham, and Pass, 1971; Tuttle and Cunningham, 1972). The same instruments were used in the present study as used previously: the Occupation Analysis Inventory (OAI), containing 622 work elements describing different kinds of work activities and conditions; and the Attribute Requirement Inventory (ARI), containing definitions of 103 human attributes in the cognitive, psychomotor, and affective domains. These instruments are contained in previous reports (OAI--Cunningham et al., 1971; ARI--Neeb et al., 1971). A list of the ARI attribute titles is presented in Appendix A.

Raters and Rating Procedure

In the present study, estimates of the requirements of the OAI work elements for the ARI attributes were obtained from 15 judges, all of whom were enrolled in the graduate program in psychology at the University of Georgia, Athens. The rating procedure was the same as that used in the Neeb et al. study. Each judge was provided a copy of the ARI, a copy of the OAI, answer sheets, and a set of instructions (the instructions and a list of the attribute titles are presented in Appendix A). The judges were instructed to rate each OAI work element (using a 0-5 scale) on the "Degree of Relevance" of the specified attribute to the type of activity or condition described in that element.

Prior to the assignments of the rating tasks, all judges attended a session in which the procedure was explained and were required, as part of their training, to perform ratings on three selected attributes. Each judge was interviewed individually to determine if he/she understood the procedure and to allow the judge to ask any questions. All practice ratings were checked by the project staff, and any apparent discrepancies in the ratings were discussed with the judges before the rating assignments were made.

Following training, each of the 103 ARI attributes was assigned to 10 judges, i.e., each OAI work element received 10 separate ratings on each of the ARI attributes. For rating assignment purposes, the 15 judges were divided into three groups of five judges each. The three groups were given attribute rating assignments as follows: Group 1, attributes 1-59 and 95-103; Group 2, attributes 25-56 and 60-94; and Group 3, attributes 1-24 and 57-103 (see Appendix A for attribute titles). Thus, a total of 1030 sets of ratings were obtained, 10 sets for each of the 103 attributes. Judges were instructed to rate last any attributes they may have already rated as part of their training. Upon return, the rating sheets were checked for completion and coded by rater and attribute. The ratings were then keypunched from the rating sheets onto data processing cards.

In addition to the ratings described above, attribute-requirement ratings obtained previously by Neeb et al. were included in the analyses of the present study. In the Neeb et al. study, a group of 12 psychology graduate students at North Carolina State University provided 9 or 10 sets of OAI ratings for each of the 103 ARI attributes. However, Neeb's

judges performed attribute-requirement ratings on only 581 of the 622 OAI work elements; they did not rate the 41 OAI Mental Activities elements. Thus, in the two studies combined, 19 or 20 judges rated the requirements of 581 OAI work elements for each of the ARI attributes. In addition, 10 judges in the present study rated the attribute requirements of the 41 OAI Mental Activities elements.

Analyses and Results

After all the data had been collected and keypunched onto data processing cards, the following analyses were carried out on an IBM 370/165 computer system.

Individual-Group Agreement for Judges

Indices of individual-group agreement were computed to determine if any of the judges were in considerable disagreement with other judges who had rated the same ARI attributes. The agreement indices were computed separately for the Neeb et al. data and the data collected in this study, for reasons of data-handling convenience and because Neeb's judges rated 41 fewer OAI items than judges in the present study. (As indicated, the judges in the Neeb et al. study did not rate the attribute requirements of the 41 Mental Activities elements in the OAI.) Preparatory to the analyses, a sample of attributes (12 for the Neeb data and 18 for the data collected in the present study) was selected representing the different sections of the ARI. For each of those selected attributes, the ratings of each judge who was assigned the attribute were correlated (using the Pearson product-moment coefficient) with the mean ratings of the remaining judges who were assigned that attribute, i.e., a judge's

profile of attribute-requirement ratings on the OAI work elements was correlated with the mean rating profile of the remaining judges.

The individual-group correlations for each judge in both the Neeb sample and the sample from the present study are presented in Appendix B, Tables 4 and 5. Tables 6 and 7 in Appendix B show the median individual-group correlation for each judge. Those medians range from .68 to .76 in the Neeb sample and from .42 to .70 in the sample for the present study. Based on an examination of the median individual-group correlations, 5 of the 15 judges recruited in the present study were identified for possible elimination from subsequent analyses. Those five judges had lower median correlations than the remaining judges in both samples.

Attribute-Requirement Weights for the OAI Work Elements

As indicated earlier, judges rated each OAI work element, or item, on its requirement for each of the 103 ARI attributes. Those ratings were then averaged for each attribute, yielding a profile of 103 mean attribute ratings for each OAI work element. For all OAI work elements except Mental Activities and Incentives, the mean ratings comprised the attribute-requirement weights for the elements.

The attribute-requirement weights for the OAI Mental Activities elements were derived as follows:

(1) For the ARI General Vocational Capabilities, Cognitive Abilities, and Psychomotor Abilities, weights were assigned to the OAI Mental Activities elements based on the investigators' judgment. This approach was taken because the Mental Activities definitions were

complex and the investigators were most familiar with them. In many instances, ARI Cognitive Abilities were directly or closely related to OAI Mental Activities elements. It was decided that the Mental Activities elements would be assigned "0" weights on all of the ARI Psychomotor Abilities.

(2) In the case of the ARI Sensory Capacities, the attribute-requirement weights for the OAI Mental Activities elements consisted of the mean ratings of 10 judges from the present study. (As mentioned, the judges in the Neeb et al. study did not rate the attribute requirements of the Mental Activities elements.)

(3) For the ARI interests and needs, weights assigned to the OAI Mental Activities elements by the investigators were added to the mean attribute-requirement ratings of 10 judges from the present study, and the resultant sums were divided by two; i.e., weights assigned by the investigators were averaged with the mean ratings of the judges.

The attribute-requirement weights for the OAI Incentives elements were derived by the two following procedures:

(1) For all of the ARI attributes except Needs, requirement weights for the OAI Incentives elements were obtained by a procedure similar to that described under (3) for Mental Activities; that is, weights assigned by the investigators were averaged with the mean attribute-requirement ratings of judges (but in this case, there were 19-20 ratings for each attribute).

(2) For the ARI Needs, weights were assigned to the OAI Incentives elements by the investigators, since in most instances there was a one-to-one correspondence between Needs and Incentives.

The resultant matrix of requirement weights for the 622 OAI work elements on 102 ARI attributes is depicted in Figure 2, and the complete set of weights is shown in Appendix C. Because one attribute (Moral Values) was eliminated based on the reliability analyses to be described next, only 102 attributes are represented in Figure 2.

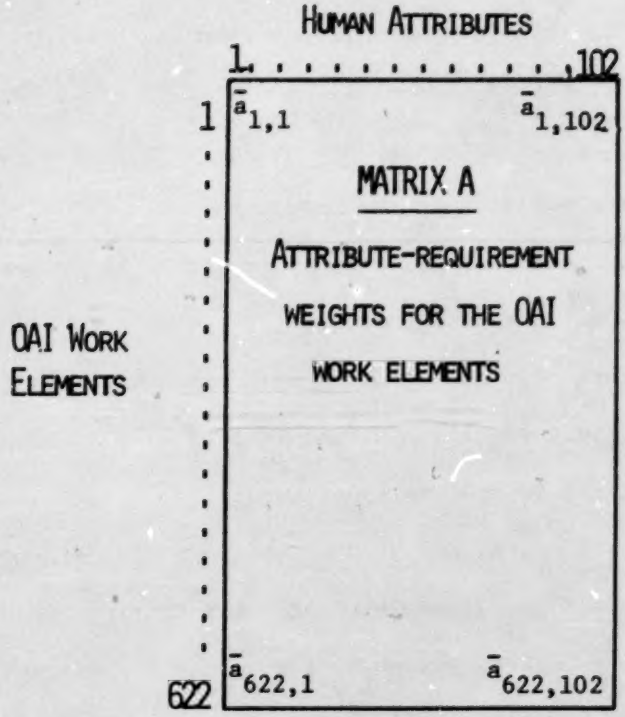

Figure 2. Attribute-requirement weights for the work elements in the Occupation Analysis Inventory (OAI)

Inter-Judge Reliabilities of the Attribute-Requirement Ratings of OAI Work Elements

An analysis-of-variance procedure (Winer, 1971) used previously by Neeb et al. was also used in this study to estimate inter-judge agreement in rating the OAI work elements on their requirements for the 103 ARI attributes. A separate repeated-measures analysis of variance was performed on the ratings for each of the 103 attributes, in which judges comprised the "treatment" variable, the OAI elements were the cases on which repeated measures (ratings) were made and attribute-requirement ratings were the dependent variable (cell entries). Since the data collected in the Neeb et al. study lacked ratings on the 41 OAI Mental Activities elements, and because two additional OAI items were eliminated and replaced between the Neeb et al. and the present study, only 579 OAI work elements were included in the inter-rater reliability analyses.

Four coefficients of reliability were computed for each attribute: the intraclass coefficient, the adjusted intraclass coefficient, the interclass coefficient, and the adjusted interclass coefficient. The adjusted coefficients are estimates in which the judges' adaptation levels are held constant (essentially, as if the ratings of each judge were standardized), whereas the unadjusted coefficients are attenuated by differences in the judges' adaptation levels. The intraclass coefficient (adjusted and unadjusted) represents the reliability of a single hypothetical rater; it approximates the average pair-wise correlation between judges' ratings on a given attribute. The interclass coefficient (adjusted and unadjusted) estimates the reliability of the mean rating profile for a given attribute. This latter coefficient can be interpreted

as the approximate correlation that would be obtained if the mean rating profile of the OAI elements on a particular ARI attribute were correlated with a corresponding mean profile based on a new sample of judges (i.e., a sample of the same size drawn randomly from the same population). Thus, the interclass coefficient estimates the reliabilities of the attribute-requirement weights for those OAI work elements whose weights consist of mean ratings. The unadjusted interclass coefficient is the appropriate reliability estimate for the attribute-requirement weights, since those weights are based on raw (unstandardized) ratings which reflect differences in rater adaptation levels.

The analyses described above were performed separately on the ratings of two samples of judges. One sample contained all of the judges from both the Neeb et al. and the present study (i.e., 19 or 20 judges per attribute), while the second sample consisted of all but the five previously mentioned judges with the lowest individual-group agreement indices. Appendix D presents the reliability coefficients for both samples of judges. From an examination of the unadjusted interclass coefficients, it was determined that the reliabilities based on the total sample of judges were generally higher than those based on the reduced sample. Accordingly, it was decided that the attribute-requirement weights for the OAI work elements would be based on the total sample of judges.

Table 1 presents the frequency distribution of the 103 unadjusted interclass reliability coefficients based on the total sample of judges. It can be seen in Table 1 that the weights for 97 of the 103 attributes (94 percent) have reliability coefficients of .80 or higher and that the

Table 1

Frequency Distribution of the Unadjusted Inter-Judge Reliability Coefficients for the Mean Ratings of 579 OAI Work Elements of 103 Human Attributes (19-20 Judges Per Attribute)

Coefficient of Reliability	Frequency	Proportion	Cumulative Proportion
.95 - 1.00	32	.310	.996
.90 - .94	46	.446	.686
.85 - .89	12	.116	.240
.80 - .84	7	.067	.124
.75 - .79	2	.019	.057
.70 - .74	0	.000	.038
.65 - .69	1	.009	.038
.60 - .64	0	.000	.029
.55 - .59	0	.000	.029
.50 - .54	0	.000	.029
.00 - .49	3	.029	.029
	103		

median coefficient falls in the .90 - .94 interval. One attribute, Moral Values, was eliminated from subsequent analyses because of its unreliability.

Derivation of Attribute-Requirement Estimates for Jobs

The synthetic (or job component) procedure developed by McCormick (1959; McCormick and Tiffin, 1974) and used by Tuttle and Cunningham (1972) to derive attribute-requirement estimates for 814 jobs was used in the present study to derive attribute-requirement estimates for a sample of 1414 jobs. Two sets of data were used: (1) the attribute-requirement weights for the OAI work elements (depicted in Figure 2) and (2) the OAI ratings of 1414 jobs by professional job analysts and trained graduate students. The OAI job ratings, collected in previous studies (Riccobono and Cunningham, 1971a, 1971b; Boese and Cunningham, 1975), are represented by Matrix B in Figure 3. The derivation of the attribute-requirement estimates for the 1414 jobs involved, essentially, the multiplication of transposed Matrix A (the matrix of attribute-requirement weights for OAI work elements, Figure 2) by Matrix B (the matrix of job ratings on the OAI work elements, Figure 3). That operation, depicted in Figure 4, resulted in a product matrix (C) containing the "raw" estimated requirements of the 1414 jobs for 102 human attributes. Each entry in Matrix C is the sum of the cross-products between a job's ratings on the OAI work elements and the elements' weights on a particular attribute. The raw attribute-requirement estimates in Matrix C were converted to standard scores, to which a constant of "9" was added in order to eliminate negative values.

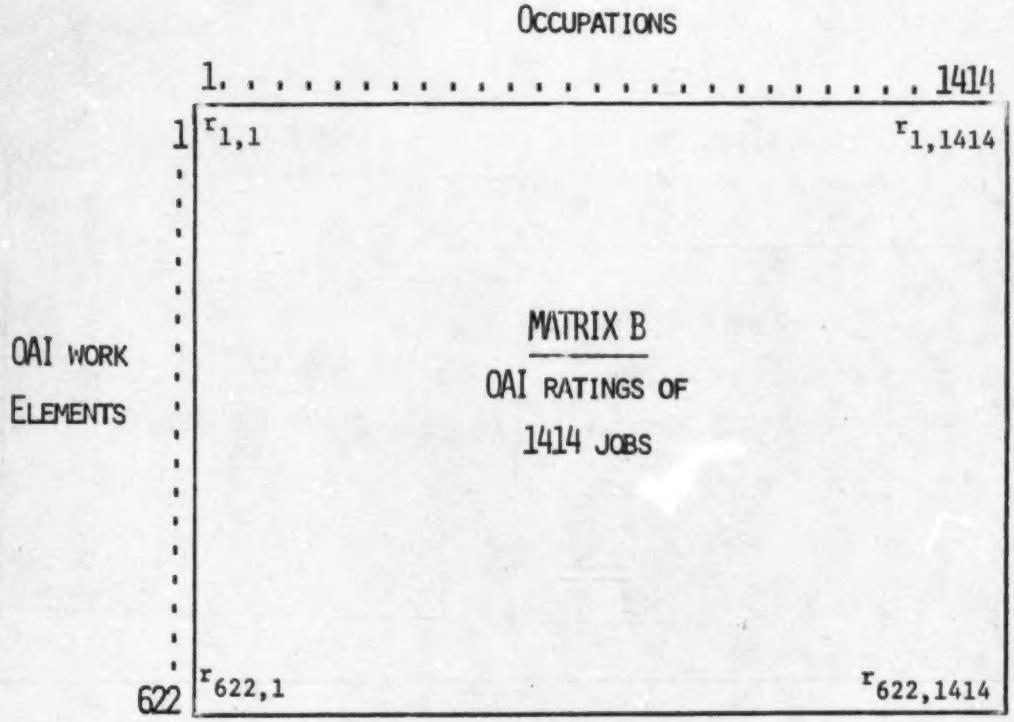

Figure 3. Ratings of 1414 jobs on the Occupation Analysis Inventory (OAI)

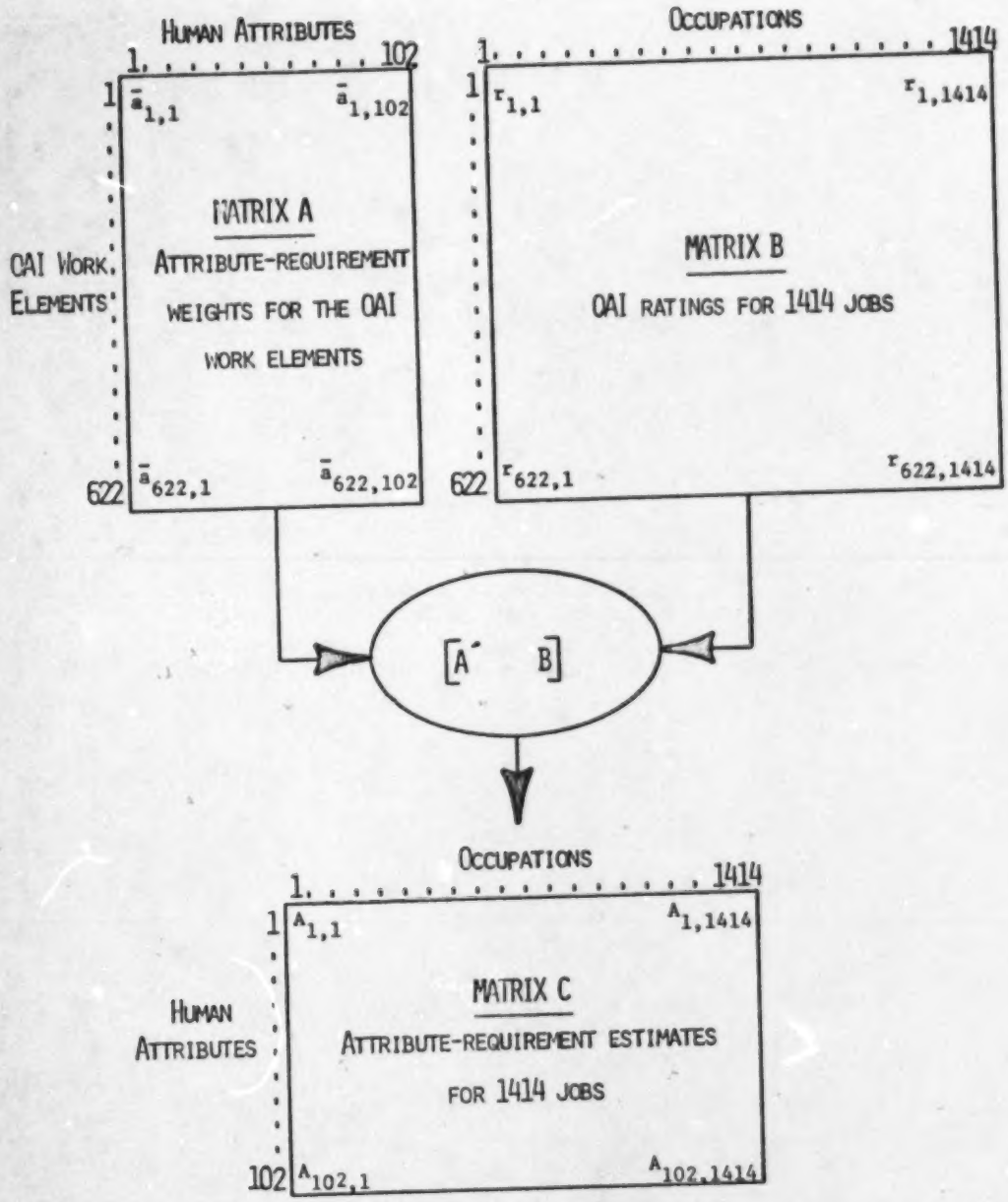

Figure 4. Procedure for deriving the estimated requirements of 1414 jobs for 102 human attributes

The resultant attribute-requirement estimates for the 1414 jobs were entered on computer tape for use in subsequent studies in the Ergometric Series (Augustin, Cunningham, and Heath, 1975; Heath, Cunningham, and Augustin, 1975; Pass and Cunningham, 1975).

Inter-Rater Reliabilities of Attribute-Requirement Estimates for Jobs

Reliability estimates for the synthetically derived attribute-requirement estimates for jobs were computed by the previously described analysis-of-variance procedure (Winer, 1971). The data used in the reliability analyses consisted of two sets of previously gathered OAI ratings for 215 jobs and three sets of ratings for 88 jobs (Riccobono and Cunningham, 1971a, 1971b; Tuttle and Cunningham, 1972). Several raters (professional job analysts and trained graduate students) contributed to each complete set of OAI ratings, and some raters contributed to more than one set; however, no rater rated the same job more than once. The titles and DOT numbers of the jobs in both samples are listed in Appendix E.

According to the previously described procedure, each of the five sets, or matrices, of OAI ratings was multiplied by the matrix of attribute-requirement weights (Figure 2) to produce two matrices (or sets) of attribute-requirement estimates for 215 jobs and three matrices of estimates for 88 jobs (see Figure 4 and accompanying procedural description). The resultant data consisted of two sets of 102 attribute-requirement estimates for each of 215 jobs and three sets of those estimates for each of 88 jobs. For purposes of reliability analysis, the

"raw" attribute-requirement estimates (i.e., sums of cross-products) were used rather than the previously described standardized scores.

A separate analysis-of-variance was performed on the estimates for each attribute within each of the two job samples, i.e., 102 analyses were performed on the data for each job sample. In those analyses, rating sets comprised the "treatment" variable, jobs were the cases on which repeated measures were made, and attribute-requirement estimates for jobs were the dependent variable (cell entries). Thus, a 215 X 2 design was used with the sample of 215 jobs and an 88 X 3 design with the sample of 88 jobs. The adjusted and unadjusted intraclass and interclass coefficients were computed for each of the 102 attributes in both job samples. Those coefficients are presented in Appendix F.

Table 2 contains the frequency distribution of the 102 unadjusted interclass reliability coefficients from the sample of 215 jobs, and Table 3 presents the distribution of coefficients from the sample of 88 jobs. As indicated earlier, the interclass coefficient estimates the reliability of a mean profile--in this case, a profile of the mean estimated requirements of a sample of jobs for a specified attribute. The means are based on two sets of attribute-requirement estimates for the sample of 215 jobs and three sets of estimates for the sample of 88 jobs. It can be seen in Tables 2 and 3 that the medians of the distributions of coefficients for both job samples fall in the .85 - .89 interval. Only six of the coefficients in Table 2 and eight of the coefficients in Table 3 are below .80.

Table 2

Frequency Distribution of the Unadjusted Inter-Rater Reliability Coefficients of 102 Attribute-Requirement Estimates for 215 Jobs (Based on 2 Sets of OAI Ratings)

Coefficient of Reliability	Frequency	Proportion	Cumulative Proportion
.95 - 1.00	0	.000	1.000
.90 - .94	47	.461	1.000
.85 - .89	26	.255	.539
.80 - .84	23	.225	.284
.75 - .79	6	.059	.059
.70 - .74	0	.000	.000
.65 - .69	0	.000	.000
.00 - .64	0	.000	.000

Table 3

Frequency Distribution of the Unadjusted Inter-Rater Reliability Coefficients of 102 Attribute-Requirement Estimates for 88 Jobs (Based on 3 Sets of OAI Ratings)

Coefficient of Reliability	Frequency	Proportion	Cumulative Proportion
.95 - 1.00	4	.039	.999
.90 - .94	39	.382	.960
.85 - .89	38	.373	.578
.80 - .84	13	.127	.205
.75 - .79	4	.039	.078
.70 - .74	3	.029	.039
.65 - .69	1	.010	.010
.00 - .64	0	.000	.000

DISCUSSION

This study involved the application of E. J. McCormick's job component procedure for the purposes of: (a) revising a set of 102 attribute-requirement weights for the work elements in the Occupation Analysis Inventory (OAI) in order to increase their reliabilities; and (b) using those revised weights, in combination with OAI job ratings, to derive a stable set of attribute-requirement estimates for a sample of 1414 jobs.

Both of those goals were realized. The attribute-requirement weights for the OAI work elements showed substantial reliability. As shown in Table 1, the revised weights for 76 percent of the attributes (78 out of 103) had unadjusted interclass coefficients of .90 or higher, and 87 percent (90 out of 103) had coefficients of .85 or higher. In comparison, the corresponding figures for the original set of weights (Neeb, Cunningham, and Pass, 1971) were 56 and 82 percent, respectively. On the other hand, there was no increase between the Neeb et al. and the present study in the number of coefficients that were .80 or higher: in both studies, the weights for 97 attributes (94 percent) reached or exceeded that value. Moreover, the reliabilities of two attributes (ARI items 99 and 103) decreased substantially in the present study. The reliability of a third attribute, the need to maintain Moral Values (ARI item 96), was not significant in either of the two studies and was therefore eliminated. In that regard, it is probably safe to assume that the OAI work elements are, for the most part, neutral as far as generally accepted "moral values" are concerned.

The reliabilities of the attribute-requirement estimates for jobs were also substantial. For the sample of 215 jobs, the median

unadjusted interclass coefficient fell within the .85 - .89 interval, and coefficients of .75 or greater were obtained for all 102 attributes (Moral Values having been excluded based on earlier analyses). The median coefficient for the sample of 88 jobs also fell within the .85 - .89 interval, and coefficients of .75 or greater were obtained for all but four attributes (whose coefficients fell within the .65 - .74 range). Based on those results, some reasonable degree of stability can be assumed in the attribute-requirement estimates for the total sample of 1414 jobs. However, it should be noted that since most of those estimates are based on only one OAI rating per job--as compared to the two or three sets of OAI ratings included in the reliability analyses--their reliabilities are more accurately reflected by the unadjusted intraclass coefficients shown in Appendix F; the mean of two or three separate estimates on the same attribute (derived from two or three sets of OAI job ratings) would be required to obtain reliabilities comparable to the unadjusted interclass coefficients in Appendix F. Thus, whenever possible, it would be desirable to obtain several requirement estimates for a job on a given attribute and average them.

As mentioned, the attribute-requirement estimates for the total sample of 1414 jobs were stored on computer tape for use in subsequent studies. Two studies using some of those data have shown significant relationships between the OAI attribute-requirement estimates for samples of occupations and the ability, interest, need, and satisfaction scores of incumbents and graduate trainees in the same occupations (Augustin, Cunningham, and Heath, 1975; Heath, Cunningham, and Augustin, 1975). The results of those studies, in combination with earlier

findings (Bates and Cunningham, in press; Tuttle and Cunningham, 1972), provide some support for the construct validity of the OAI-based attribute-requirement estimates. In another recently completed study (Pass and Cunningham, 1975), an occupational cluster structure was derived based on the OAI work-dimension (factor) profiles of the 1414 aforementioned jobs, and the mean attribute-requirement profiles of jobs within each of the resultant clusters provided one basis for cluster description and interpretation.

The results to date seem encouraging in regard to the potential utility of the OAI-based attribute-requirement estimates in occupationally related education and guidance. In the guidance setting, for example, it might prove feasible to relate the student's test score profile to the corresponding attribute-requirement profiles of occupations and occupational clusters. The attribute-requirement estimates might also be used in the development of occupational information materials (e.g., for vocational exploration purposes) and in studying the entry requirements of occupationally related education programs (Cunningham, 1971; Cunningham et al., 1971).

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APPENDICES

APPENDIX A

RATING INSTRUCTIONS AND LIST OF THE ATTRIBUTES IN THE ATTRIBUTE REQUIREMENT INVENTORY (ARI)

RATING OF WORK ELEMENTS ON HUMAN ATTRIBUTE REQUIREMENTS: INSTRUCTIONS

Materials To Be Used

Occupation Analysis Inventory (OAI): A 540-item inventory describing work elements under five major headings: Information Input; Mental Processes; Behavioral Output; Work Goals; and Work Context.

Attribute Requirement Inventory (ARI): A 103-item inventory defining human attributes in the following categories: General Vocational Capabilities; Cognitive Abilities; Psychomotor Abilities; Sensory Capacities; Interests; and Needs.

Answer Sheets: Each item in the answer sheets is coded to correspond to an item in the Occupation Analysis Inventory. The scale values "0" to "5" appear in each item in the answer sheet.

What You Are To Do

Steps:

1. First, familiarize yourself with the Occupation Analysis Inventory (OAI) by reading through all of the items (work elements). However, do not confuse the instructions in the front of the OAI booklet with the instructions which you are to carry out.

2. Then, carefully read one of the attribute definitions in the Attribute Requirement Inventory (ARI).

3. Next, read each OAI item (work element) and consider whether or not the ARI attribute in question is relevant to that work element; that is, whether or not the ARI attribute contributes to the worker's performance in dealing with that OAI work element. Then, by circling the appropriate value (0 through 5) on the answer sheet, rate the OAI item on the Degree of Relevance of the attribute in question to the work element described in that OAI item.

When rating OAI items on GENERAL VOCATIONAL CAPABILITIES, COGNITIVE ABILITIES, PSYCHOMOTOR ABILITIES, and SENSORY CAPACITIES, Degree of Relevance (of the attribute to the work element) should be thought of in terms of the level or amount of the human ability or capacity in question required of the incumbent in order for him to deal effectively with the

OAI element, when that work element is a very significiant part of the job.*

When rating OAI items on INTERESTS and NEEDS, Degree of Relevance (of the attribute to the work element) should be defined as the extent to which the attribute in question is compatible with the OAI work element; that is, the extent to which a worker who is high on the specified Interest or Need would find satisfaction in dealing with the OAI work element, assuming that work element was a very significant part of his job.*

The scale which you are to use is defined below:

Scale Value	Degree of Relevance
0	Does not apply
1	Very limited relevance
2	Limited relevance
3	Moderate relevance
4	Substantial relevance
5	Very high relevance

4. For each ARI attribute which you are assigned, apply Step 3 (above) to every OAI item.

Caution:

In rating each OAI item, be sure to indicate the contribution of the attribute to the work element described in the item, and not vice versa. For example, if the attribute were the General Vocational Capability, Tools (Attribute 1 in the ARI), and the OAI item were Manual Dexterity (OAI item 5a), a rating of "0" would be assigned, since Manual Dexterity does not require tool skill even though tool skill might require Manual Dexterity. To insure against reversing the direction of a rating, it would be helpful to use the following format in performing a rating:

> "This attribute is of (0-5) Degrees of Relevance in dealing with the work element described in OAI Item ____, when this work element is a very significant part of a job."

---

*An OAI work element is a "very significant" part of the job, when the job receives the highest possible rating (usually a "5") on the OAI item which describes that element. (See Instructions, OAI)

Example:

Suppose you were rating OAI Item 79i, Content or Meaning of Written Verbal Information (turn to this item in the OAI), on the ARI attribute of Verbal Comprehension (see ARI Attribute 33). Since a very high amount of Verbal Comprehension is required in dealing with the content or meaning of written information when this work element is a very significant part of a job, OAI Item 79i would receive the following rating on the answer sheet:

0 1 2 3 4 (5)

On the other hand, if you were rating OAI Item 79i (Content or Meaning of Written Verbal Information) on the ARI attribute of Multi-limb Coordination (ARI Attribute 46), you would assign a rating of "0" [(0) 1 2 3 4 5], since Multilimb Coordination is not required in dealing with the Content or Meaning of Written Verbal Information when this work element is a very significant part of a job.

General Vocational Capabilities

1. Tools
2. Mechanical Systems
3. Stationary Machine and Equipment Operation
4. Vehicular Operation
5. Connections and Fittings
6. Fluid Systems
7. Measuring Instruments
8. Electricity
9. Layout and Visualization
10. Structures
11. Materials
12. Chemicals
13. Foods and Cooking
14. Biological Systems
15. Medical and First Aid
16. Arithmetic Computation
17. Arithmetic Conventions
18. Clerical
19. Verbal Communication
20. Sales
21. Service
22. Dealing with Social Situations
23. Etiquette and Social Grace
24. Style and Grooming

Cognitive Abilities

25. Closure
26. Form Perception
27. Perceptual Speed
28. Spatial Scanning
29. Spatial Orientation
30. Visualization
31. Number Facility
32. Memory
33. Verbal Comprehension
34. Grammar
35. Spelling
36. Expressional Fluency
37. Ideational Fluency
38. Sensitivity to Problems
39. Deductive Reasoning
40. Inductive Reasoning
41. Originality
42. Social Intelligence
43. Aesthetic Judgment
44. Musical Aptitude

Psychomotor Abilities

45. Control Precision
46. Multilimb Coordination
47. Reaction Time
48. Eye-Hand Coordination
49. Manual Dexterity
50. Finger Dexterity
51. Arm-Hand Steadiness
52. Explosive Strength
53. Static Strength
54. Dynamic Strength
55. Body Equilibrium
56. Stamina

Sensory Capacities

57. Near Visual Acuity
58. Far Visual Acuity
59. Depth Perception
60. Color Discrimination
61. Auditory Acuity
62. Tactual Discrimination

Interests

63. Manual Work
64. Machine Work
65. Personal Service
66. Care of People or Animals
67. Clerical Work
68. Inspecting and Testing
69. Crafts and Precise Operations
70. Customer Services
71. Nursing and Related Technical Services
72. Skilled Personal Services
73. Training
74. Literary
75. Numerical
76. Appraisal
77. Agriculture
78. Applied Technology
79. Promotion and Communication
80. Management and Supervision
81. Artistic
82. Sales Representative
83. Music
84. Entertainment and Performing Arts
85. Teaching, Counseling, and Social Work
86. Medical

Needs

87. Ability Utilization
88. Achievement
89. Activity
90. Advancement
91. Authority
92. Compensation
93. Co-Workers
94. Creativity
95. Independence
96. Moral Values
97. Recognition
98. Responsibility
99. Security
100. Social Service
101. Social Status
102. Variety
103. Working Conditions

APPENDIX B

INDIVIDUAL-GROUP AGREEMENT INDICES

Table 4

Individual-Group Agreement (Correlation) Coefficients for 12 Judges on Selected ARI Attributes[a,b]

	Attribute Item Number											
Raters	1	24	25	43	45	56	57	62	63	86	87	103
1	.809	.469	.541	.967	.621	.630	.907	.742	.657	.930	.901	.785
2	---	---	.529	.794	---	---	.791	.753	.710	.843	.791	.785
3	.828	.620	.572	.920	.677	.561	---	---	---	---	---	---
4	.874	.698	.742	.952	.829	.794	.909	.566	.601	.864	.832	.785
5	.808	.657	.703	.834	.835	.682	.892	.628	.622	.833	.824	.701
6	.744	.515	.431	.898	.716	.262	.792	.707	.524	.780	.824	.785
7	.797	.492	----	---	---	---	---	---	---	---	---	---
8	.863	.480	.516	.783	.711	.768	.758	.612	.684	.638	.666	.785
9	---	---	---	---	---	---	.800	.662	.686	.784	.690	.636
10	.794	.664	.621	.922	.692	.530	.757	.519	.636	---	---	---
11	.763	.604	.536	.850	.724	.503	.719	.629	.513	.776	.767	.185
12	.733	.623	.485	.901	.503	.691	.798	.642	.666	.763	.774	.157

[a]A dash occurs when a judge did not rate a particular selected attribute.

[b]The coefficients in this table were computed from rating data gathered in a previous study (Neeb, Cunningham, and Pass, 1971).

Table 5

Individual-Group Agreement (Correlation) Coefficients for 15 Judges on Selected ARI Attributes[a]

	Attribute Item Number																	
Raters	1	2	24	25	43	45	56	57	59	60	62	63	86	87	94	95	102	103
1	.737	---	.596	.508	.815	.749	.463	.601	.611	---	---	---	---	---	---	.607	---	.237
2	.768	---	.619	.368	.867	.685	.572	.456	.316	---	---	---	---	---	---	.617	---	.610
3	.709	---	.564	.147	.793	.387	.606	.724	.708	---	---	---	---	---	---	.195	---	.601
4	.761	---	.297	.477	.887	.669	.733	.729	.541	---	---	---	---	---	---	.593	---	.427
5	.806	---	.297	.491	.645	.580	.280	.542	.385	---	---	---	---	---	---	.311	---	.200
6	---	---	---	.644	.809	.823	.549	---	---	.643	.432	.803	.788	.636	.589	---	---	---
7	---	---	---	.690	.629	.512	.205	---	---	.523	.432	.604	.638	.169	.330	---	---	---
8	---	---	---	.721	.817	.722	.545	---	---	.698	.598	.699	.720	.474	.486	---	---	---
9	---	---	---	.607	.809	.732	.490	---	---	.763	.482	.658	.759	.616	.476	---	---	---
10	---	---	---	.459	.845	.664	.371	---	---	.811	.475	.761	.697	.491	.613	---	---	---
11	.694	.463	.428	---	---	---	---	.360	---	---	.495	.653	.737	.271	---	---	.346	.264
12	.712	.436	.325	---	---	---	---	.396	---	---	.499	.367	.587	.534	---	---	.298	.115
13	.671	.357	.479	---	---	---	---	.573	---	---	.387	.690	.608	.543	---	---	.574	.387
14	.827	.509	.552	---	---	---	---	.629	---	----	.689	.777	.743	.549	---	---	.558	.406
15	.637	.416	.260	---	---	---	---	.176	---	---	.433	.641	.558	.446	---	---	.115	-.125

[a]A dash occurs when a judge did not rate a particular selected attribute.

Table 6

Median Individual-Group Agreement Coefficients for 12 Judges[a]

Judge	Median
1	.763
2	.791
3	.648
4	.811
5	.805
6	.730
7	.644
8	.697
9	.688
10	.650
11	.674
12	.678

[a]The coefficients in this table are based on the ratings of 12 judges recruited for a previous study (Neeb, Cunningham, and Pass, 1971).

Table 7

Median Individual-Group Agreement Coefficients for 15 Judges[a]

Judge	Median
1	.604
2	.610
3	.604
4	.632
5	.438
6	.644
7	.518
8	.699
9	.639
10	.638
11	.446
12	.416
13	.558
14	.594
15	.425

[a]The coefficients in this table are based on the ratings of 15 judges recruited specifically for the present study.

APPENDIX C

ATTRIBUTE-REQUIREMENT WEIGHTS FOR OAI WORK ELEMENTS

Table 8

Attribute-Requirement Weights for OAI Work Elements[a,b]

	ATTRIBUTE
	0000000000000000000000000000000000000000000000000000000000
	0000000001111111111222222222233333333334444444444555
ITEM	1234567890123456789012345678901234567890123456789012
1I	14330110000000000000000000000000000000200000000000000
2I	13330120000000000000000001000000000001000000000000000
3I	13231110000000000000000001000000000001000000000000000
4I	13231200000000000000000001000000000001000000000000000
5I	13340110000000000000000000000000000001000000211000010
6I	14221000100000000000000010010100000000000000000000000
7I	14240000000000000000000000100000000000000000000000000
8I	14101000410000020000000013020311000000000000000000000
9I	02120230000000010000000011010001000000000000000000000
10I	13110150000000020000000000000011000000100000000000000
11I	14111100000000010020000000100001411100000000000000000
12I	04100100000000020020000000100011421000120000000000000
13I	11100015000000000000000001000000000002000000000000000
14I	11111004000000000000000001000000000001000000000000000
15I	11113005000000000000000011010100000001100000000000000
16I	11111015000000000000000000000000000001000000000000000
17I	11110014000000000000000000010000000000000000010100010
18I	01001005300000010000000023020211000000100000000000000
19I	01000005000000000000000011000010000000000000000000000
20I	01000024000000010000000001010001000000000000000000000
21I	01000055000000010000000000000011000000100000000000000
22I	11100015000000010020000000100001421100100000000000000
23I	01000005000000010020000000100011421000120000000000000
24I	13113100340000000000000022011300000001100000000000000
25I	13105100042000000000000001000000000001000000000000000
26I	11103010241000000000000011010100000001000000000000000
27I	01001000310000000000000021011300000001000010000000000
28I	03002000440000020000000023021411000000100000000000000
29I	01001000420000010000000022021311000000100010000000000
30I	11000040430000020000000000000121000000100000000000000
31I	02001000140000021020000000100101411101000000000000000
32I	03000000041000020020000000100011421001120000000000000
33I	00000010004020000000000002000000000000000001000000000
34I	00000010015010000000000103000000000000000001000000000
35I	00000020015010010000000000000010000000000000000000000
36I	00000100003140000000000000000000000000000000000000000
37I	00000300014200000000000000000000000000000000000000000
38I	02001020035000000000000000000000000000000000000000000
39I	01000110015120000000000000000000000000000000000000000
40I	01001010015000000000000000000000000000000000000000000
41I	01001010015000000000000000000000000000000000000000000
42I	01001010015000000000000000000000000000000000000000000
43I	01000110014201100000000000000000000000011000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999999000
ITEM	34567890123456789012345678901234567890123456789123
1I	00001110312400023000000201000100001000000000100000
2I	00002111012400043000000201000100001100000000100000
3I	00002110112400023000000100000100000000000000000010
4I	00002110211400023000000101000100001000000000000010
5I	00002110122400014010000010000000001010000000100000
6I	00002120001400013000000101000100001000000000000000
7I	00002230002400012000000101000100000000000000100000
8I	00003010001300012000000203000100001011000000000000
9I	00003011101300032000000101000100000000000000000000
10I	00003000001300043000001020001000010000000000000000
11I	00003000001300022000120203000200101011000000000000
12I	00003000000100011000022203000000101111000000000001
13I	00001111201300033000000201000200001100000000100000
14I	00002110112300023000000200000100000000000000100010
15I	00003121011200013000000201000100001010000000100000
16I	00002010101200023000000101000100001000000000000010
17I	00003010112300013010000000000100001010000000100000
18I	00004011000200012000000203000100001011000000000000
19I	00003001000200012000000102000100000000000000000000
20I	00003101101200032000000101000100000000000000000000
21I	00003000001200043000000102000100001010000000100000
22I	00003000001200022000120203000200101011000000000001
23I	00003000000100011000022204000000101111000000000001
24I	00002230011200023000000202001100001010000000000001
25I	00001110011200023000000201000000000000000000100001
26I	00003220011200033000000201001100001100000000100001
27I	00001231001100011000000201002000001001000100100001
28I	00004010000200012000000203001100001011000000000001
29I	00003010000100011000000202002100001011000000000001
30I	00003010001100022000000203001100001011000000000001
31I	00003000000200022000120303000100101011000000000001
32I	00003000000100011000022303000000101111000000000001
33I	00002113120100042002000311002100001000000000100001
34I	00002123040100032001000201003000000000000000100001
35I	00000000021100032001000201001000000000000000000001
36I	00000000000000031002000101001000001000000000100001
37I	00001000010000021000000201000000000000000000000001
38I	00001000011100032000000202001000000000000000100000
39I	00001010021100032001000201001000000000000000000000
40I	00001000010100032000000202001000000000000000100000
41I	00001000010100032000000202000000000000000000100000
42I	00001000010100032000000202001000000000000000100000
43I	00001000011101032010000202000000010000000000100000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
441	01000110015501000000000000000000000000100000000000000
451	01001014015100000000000000000000000000000000000000000
461	11000251014200020000000000000020000000100000000000000
471	01000010014301001000000000100001000000000000000000000
481	01000000004110000020000000000014111000000000000000000
491	01000110004301020020000001000114210001100000000000000
501	00000000000102000000000000010000000001000000000000000
511	00000000000201000000000001010000000001000000000000000
521	00000010010000000000000022011000000001000000000000000
531	00000010000101000000000010000000000001000000000000000
541	00000010000000000000000320221000000011100000000000000
551	00000010000000000000000220210000000011100000000000000
561	00000000000000000000000100100000000020000000100000000
571	00000010300000012000000023031211000000000000000000000
581	00000050000201020000000000000001000000010000000000000
591	00000010000000024000000001210031100000100000000000000
601	00000000000100011020000000100011411100010000000000000
611	00000000100000000001000221010100000001000050000000000
621	00000000200000000000000125010300000000001050000000000
631	00000000300000000010001210112000000010011500000000000
641	00000000000000000000000000000000000000000004500000000
651	00000000000000000000101100000000000000013400000000000
661	00000000410000010000000123010301000000000400000000000
671	00000000000000000000000000110001000000000014000000000
681	00000000100000000030000000100001411100000030000000000
691	00000000000034300000100011000000000002100000000000000
701	00000000000004400000100011000000000011000000000000000
711	00000000000004300000000000000000000000000000000000000
721	00000000000002300000010010000000000011003000000000000
731	11000010002003500000100000000000000000000000000000000
741	00000000002242200000100000000000000000000000000000000
751	00000001000054000001000340312010000011100000000000000
761	10000050000114520000100000000011000000100000000000000
771	00000000000013400020100000000001300001110200000000000
781	00000000000124411030100000000011421100110000000000000
791	01000001000001100141000000200002531100310000000000000
801	00000000000000000410000000410001211000000000000000000
811	00000000000000000540000000310003450000000000000000000
821	00000000000000000440000000200004511000000000000000000
831	00000000000000000420000000310001311000000000000000000
841	00000000000000004200000000100041000000310000000000000
851	00000000000000004200000000100041000000310000000000000
861	00000010000000043100000000100051000000100000000000000

Table 8 (continued)

	ATTRIBUTE
	000000000000C000000000000000000000000000000001111
	555555566666666667777777778888888888999999999990000
ITEM	345678901234567890123456789012345678901234567890123
441	000010000001000320000002020000000000000000000100000
451	000000000001000320000002020000000000000000000100000
461	000030011001000420000002020000000010100000000000001
471	000030000001000110000002020000000010000000000000001
481	000030000012000210010102010001000010100000000000001
491	000030000000000210000223040000001010110000000000001
501	000012110110000100000001500000000000000000000000010
511	000012220110000100000002500000000000000000000000000
521	000013310010000100000002300000000000000000000000010
531	000012110010000200000003300000000000000000000000010
541	000014310000000000000012000000000011100000000010111
551	000003210000000100000013200000000010000000000010010
561	000002210010000000000002100000000010100000000100010
571	000040110000000000000012110000000010110000000000000
581	000030111001000310000013320000000010110000000000011
591	000030000000000100000012210000000010110000000000001
601	000030000000000000002222200000010111100000000000001
611	000022150000000010010001000050010011110001101100111
621	000022300300000110000001000050000011110001101100011
631	000013410000000010000001000050030011101001101100011
641	000000005000000010000000000020530011110001101100111
651	000012102000100010000000000030241011110011101000011
661	000030120000000010000001000050030010110001100000011
671	000030001000000010000000000020520011110001100000011
681	000030010000000010001301000040231010110001100000111
691	000011110000230100410000300000000411010000100112110
701	000011110100240100510000300000000511010000100113111
711	000011100000130100400000300000000410000000000011011
721	000011002000240000410000100000000410010000100112011
731	000010100100130100500000200000000511100000000011000
741	000010000001120100320001200000000410100000000011001
751	000040110000120110400300011000000051010000000111111
761	000030002001130310500000110000000051010000000111111
771	000000002000130000410000000000000051001001010011211
781	000030000000130000410211210000001511110000100111111
791	000030000000000111010142113310100221121000010000111
801	000040000000004100000100001000000000100000000000001
811	000040000000004100000300001000001010100000000000001
821	000030000000003100000400002000001010100000000000001
831	000030000000004100000100000000001000100000000000001
841	000020000000000000000051030000001121110000000000101
851	000020000000000000000051030000001121110000100000101
861	000030000000002000000051010001001110200000000000001

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000000000
	00000000011111111112222222223333333333444444444455555
ITEM	12345678901234567890123456789012345678901234567890123456789012
87I	000000100010000351000000012200411000001000000000000000
88I	000000100000000341000000002000401000001100000000000000
89I	010000014100000120000000231213110000000000000000000000
90I	000000010001000042000000003000011000000000000000000000
91I	000000000000000004422100002000034220001001000000000000
92I	000000000000000222111000001000231000001000000000000000
93I	000000000000000211021000000000300000000000000000000000
94I	000000000000000031000000000100000000000100000000000000
95I	000000001000000000141000100000002100000010100000000000
96I	000000000000000001144221000000011001000003000000000000
97I	000000000000000451020000002100411000001000000000000000
98I	000000000000000251020000011201411000001000000000000000
99I	000000000000000011132000000100001421100100000000000000
100I	000000000000000010142100000100011431101200000000000000
101I	000000000000002300000100200000000000000000010000000000
102I	000000000000000000011125000000000000000000110000000000
103I	000000000000010000001002000000000000000000100000000000
104I	000000000000010000001000000000000000000100100000000000
105I	000000000000010000000000000000000000000000000000000000
106I	000008000000000000210100000000013101001001000000000000
107I	000000000000000000123421100000011000001004000000000000
108I	000000000000000000004101102100000000100030000000000000
109I	000000000000012000001400110200010000020002000010000000
110I	000000000000000000001200100100000000010001000000000000
111I	000000000000000000111410000000011000010003000000000000
112I	000000000000011110101100000000012110001001000000000000
113I	000000000000000100111110000000012100001101000000000000
114I	000000000000000100200100000000013110001101000000000000
115I	000000000000002400100000122003110000011000000000000000
116I	000000001000000001000000221111000000000001100010000000
117I	000100000000000000000002211111000000000001000010000000
118I	000100001100000000000000220121000000000001000010000000
119I	000000001000000000000001210101000000000001000010000000
120I	000000000000000000000000000000000000000000001200000000
121I	001000000000000000000000000010000000000000012011111111
122I	000000000000000000000000000020000000000000012010000000
123I	100000000000001000000000000000000000000000010001100000
124I	000000000002000000000000000000000000000000000000000000
125I	000001000001100000000000000000000000000000000000000000
1M	000000000000000000000006000000000000000000000000000000
2M	000000000000000000000007000000000000000000000000000000
3M	000000000000000000000009000000000000000000000000000000
4M	000000000000000000000009000000000000000000000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888899999999990000
ITEM	34567890123456789012345678901234567890123456789123
87I	00003000000000110000004102010200111000000000000001
88I	00003000000000110110004102010200110000000000000001
89I	00003011000100011000002103001100111000000000000001
90I	00003000000000301000012001100110001000000000000001
91I	00000000300021300321111000310201121011001000100l
92I	00001000300010100100002000010000001010000000000001
93I	00002000000010100300001000010300000000000000000001
94I	00001111011010010300000000110400001010000000000001
95I	00002111000010000200000000312300001011000100000001
96I	00000000100041100403000000311501111111000000010l011
97I	00003000000000310200004100120300001001010000000001
98I	00003000000000100100003100120200001111010000000001
99I	00003000000000200100112100220300101111000000000011
100I	00003000000000100100020000210200002111000010010011l
101I	00001110010024010033100000001000140000000000102011
102I	00001212000034000115100000111001110010101111011020l1
103I	00001211011015000001000020001000010010000110110101l
104I	00001220100022010001500000020012211111201010110101l
105I	00000220000014010000500020000001010110100010110001l
106I	00000000200022000101400000120000311111201010110211l
107I	00000100200044000323200000311202221111101010110211l
108I	00000320100021000100000000210002101010101000010101O
109I	00010320100033000120000100110000121010100010110202O
110I	00000220000022000010000001100000111000001000000301O
111I	00000210100022100100200000220101311010101010111101l
112I	00002000000012100120210000120100320000100000000100l
113I	00002000000021000210111100310201211000100000000100l
114I	00003000000021000010110000210001101000100000000101l
115I	00003000000011100000102101110100211000000000000100l
116I	00005021000111212011011111001100110000000000000000
117I	00000521000111011000000111001100010000000000000000
118I	00000251000111011000000100001000010000000000100000
119I	00001105000111011011000100002100010000000000000000
120I	00000000500111111000000000001141111000000000100000
121I	11300000011100001000000000001013001010000000000000
122I	10500010011100000000000000001002011010000000000000
123I	00000000051100021011000000001000021000000000100000
124I	00000000000000001000100000000000C0001000000000100000
125I	00000000000000001000100000000000000010000000000100000
1M	00002531000100011010000010001000021000000000000000
2M	0000433100010001101000001000100002100000000000000O
3M	00001350000000000000100110001001021000000000000000
4M	00001120000100001001000111002001011000000000000000

Table 8 (continued)

ITEM	ATTRIBUTE 0000000000000000000000000000000000000000000000000000 0000000001111111111222222222233333333334444444444555 1234567890123456789012345678901234567890123456789012
5M	0000000000000000000000000003000000000000000000000000
6M	0000000000000000000000000300330400000000000000000000
7M	0000000000000000000000003300050000002332000000000000
8M	0000000000000000000000003000300000022222020000000000
9M	0000000000000000000000009000000000000000000000000000
10M	0000000000000000000000003000300000020222090000000000
11M	0000000000000000000000000000000009000000000000000000
12M	0000000000000004300000000000004300000030000000000000
13M	0000000000000000000000000000003000000070000000000000
14M	0000000000000000000000000000007000000000000000000000
15M	0000000000000009300000000000009300000000000000000000
16M	0000000000000042000000000000043000000500000000000000
17M	0000000000000042000000000000043000000320000000000000
18M	0000000000000000000000000000002033000000000000000000
19M	0000000000000042000000000000043000000320000000000000
20M	0000000000000000500000000900000000000000000000000000
21M	0000000000000043000000000000043000000300000000000000
22M	0000000000000000060000000000009000000000000000000000
23M	0000000000000000030000000000003000003300000000000000
24M	0000000000000000030000000000003000094200000000000000
25M	0000000000000000020000000000062000000000000000000000
26M	0000000000000000030000000000063000002000000000000000
27M	0000000000000000020000000000062000000000000000000000
28M	0000000000000000030000000000003000008000000000000000
29M	0000000000000000030000000000003000033200000000000000
30M	0000000000000000030000000000003223302090000000000000
31M	0000000000000000030000000000003223802000000000000000
32M	0000000000000000050000000000004439002000000000000000
33M	0000000000000000030000000000003222402040000000000000
34M	0000000000000000030000000000003222303200000000000000
35M	0000000000000000040000000000004203300000000000000000
36M	0000000000000000080000000000004834202200000000000000
37M	0000000000000000006200000000000000020090000000000000
38M	0000000000000000000062000000000000003308000000000000
39M	0000000000000003225002200020003454444343222000000000
40M	0000000000000002002001000000002222222222110000000000
41M	0000000000000003223003200020003333233332230000000000
1T	5100000000200010000000000000000000000000000011044123
2T	5100000000200000000000000000000000000000000011044122
3T	5100000000200010000000000000000000000000000011044232
4T	5110000000200000000000000000000000000000000011044221
5T	4100400000200000000000000000000000000000000001034120
6T	5101400001100000000000000000000000000000000011034122

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888899999999990000
ITEM	34567890123456789012345678901234567890123456789123
5M	00003120000100011000000001001000021000000000000000
6M	00001100000100011000000111001001011000000000000000
7M	00001110000100001000000212001000011100000000000010
8M	00001010000000000100100010100200201110000020000010
9M	00004010000100021011000111002001021000000000000000
10M	00002113010000000001000000002022001000000200000000
11M	00003000000000200000010000100000001000000000000000
12M	00001000000000000000002102000000001000000000000000
13M	00001000000000000000011020000000010000000000000000
14M	00000000000010000100002000000000001000000000000000
15M	00001000000100001000001101000000001000000000000000
16M	00001000000000000000011020000000010000000000000000
17M	00001000000000000000011020000000010000000000000000
18M	00000000000000000000022001200001001000000000000000
19M	00001000000000000000011010000000010000000000000000
20M	00004000000000200000002001100100001000000000000000
21M	00002000000000000000011020000000010000000000000000
22M	00001000100010100000122001210101111000000000000000
23M	00000000000000000000112102120100111100000000100010
24M	00000000000000000100110202120100111100100000100010
25M	00000000000010000100110101220102002000000000000000
26M	00000000000010000100110101110102001000000000000000
27M	00000000000010000200110101220202002000000000000000
28M	00000000000000000000002102110100011000000000000000
29M	00000000000100001001102212021100111100100000200000
30M	00000000000000000000020001110102001000002000000010
31M	00000000000000000100010001110100001000000000000000
32M	00000000000000000000020001210202101000000000000000
33M	00000000000000000000020002110202001000000200000010
34M	00000000001000010010001111211000111001000000100000
35M	00000000000000000000010000110100001000000000000000
36M	00001000000000200000020000110101001000000000000000
37M	00000100000022111232211111221322332111212110111211
38M	00000100100011000010200000220122212000202000002000
39M	00000000000000000001011220211111122100110012002002
40M	00000000000000111010000111011122121000000000000000
41M	00000000000000001000000111011222111000100000000100
1T	22023020014200003000000000001000020120000000000000
2T	22013020014200003012000010000000010120000000000000
3T	22013020024200003001000010001000021120000000000000
4T	11013020023200003001000000001000000120000000000000
5T	01002010013200003000000000000000000120000000000000
6T	22012010014300003000000000000000000120000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
7T	51003000001000100000000000000000000000000000000011044321
8T	41000000002000100000000000000000000000000000000001034120
9T	41000000002000000000000000000000000000000000000011034111
10T	41000000002000000000000000000000000000000000000011034111
11T	41000000012000000000000001000100000000000000011033110
12T	51001000002000000000000001000100000000000000011044122
13T	51000000002000000000000000000000000000000000000011034121
14T	41000000001000000000000000000000000000000000000001034111
15T	31000000001000000000000000000000000000000000000001034100
16T	41000000001000000000000000000000000000000000000001034102
17T	21000000000000000000000000011000000000000000012244113
18T	31000010000004510000000000000001000000000000011134230
19T	00000000000000000000000000000000000000000000000000000000000
20T	51001000100001200000000002010100000001000000011043440
21T	51100000002000000000000000000000000000000000000011134121
22T	51100000002000000000000000000000000000000000000011134120
23T	51100000002000000000000000000000000000000000000011134120
24T	51100000002000000000000000000000000000000000000011134120
25T	51101000002000000000000000000000000000000000000011134120
26T	51104001002000000000000000000000000000000000000011134130
27T	51104000002000000000000000000000000000000000000011144120
28T	51103000001000000000000000000000000000000000000011134120
29T	51104000012000000000000000000000000000000000000011134120
30T	41101000002000000000000000000000000000000000000011134111
31T	41100000002000000000000000001000000000000000011133120
32T	41100000002000000000000000000000000000000000000011133110
33T	51100000002000000000000000000000000000000000000011134110
34T	51100000002000000000000000000000000000000000000011134130
35T	51100000002000000000000001000100000000000000011134120
36T	41100000002000000000000000000000000000000000000011134120
37T	41100000001010000000000000000000000000000000000001023110
38T	41100000001000000000000000000000000000000000000011033111
39T	21000000000000000000000000001000000000000000011133121
40T	31100000000003510000000000000001000001000000011133120
41T	00000000000000000000000000000000000000000000000000000000000
42T	41101001000001100000000001010100000001000000021043340
43T	21001000000000000000000000000000000000000000000012000
44T	21000000000000000000000000000000000000000000000012001
45T	21001000000000000000000000000000000000000000000011000
46T	21000000000000000000000000001000000000000000001012011
47T	00000000000000000000000000000000000000000000000000000000000
48T	21500000001000000000000000000000000000000000021143120
49T	21500000002000000000000000000000000000000000021143120
	21500000001000000000000000000000000000000000021133020

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
ITEM	34567890123456789012345678901234567890123456789123
7T	11013010013200003001000000000000201200000000000000
8T	01112011014200003011000000002000011120000000000000
9T	11112010024200003000000000001000000120000000000000
10T	12012010014200003000000000001000000120000000000000
11T	01013020023300003000000000001000001120000000000000
12T	12013020023200003000000000001000001120000000000000
13T	22013020013200003000000000000000001200000000000000
14T	21011120014200002001000000000000010020000000000000
15T	11011110014100001000000000000000010120000000000000
16T	22021110014100001000000030000000001200000000000000
17T	21121230012100001000000000000002001121001000000000
18T	00003020221102001040000000000000041120000000101100
19T	00000000000000000000000000000000000000000000000000
20T	00004130021300014021000001002000033211000100110010
21T	11012020014400003000000010000000000120000000000000
22T	11012020014401003002000000000000001120000000000000
23T	11012010014400003001000000000000000120000000000000
24T	11013010013400003000000000000000001120000000000000
25T	01013020013400003000000000000000001120000000000000
26T	00013020013300003000000000000000001120000000000000
27T	00013010013300003000000000000000001120000000000000
28T	00003010013400003002000000000000001120000000000000
29T	12002010013400003000000000000000001120000000000000
30T	01002111013300003000000000001000001020000000000000
31T	11012110013300003000000000000000001120000000000000
32T	11012010013300003000000000000000000200000000000000
33T	11013020013400003000000000000000001120000000000000
34T	11013020013400003000000000000000001120000000000000
35T	10002010013400003000000000000000001120000000000000
36T	00001110013300002001000000000000000120000000000000
37T	11011120014300001000000020000000000120000000000000
38T	00001230012200001000000000000000100112000000000100000
39T	00002010111301011030000010000000041120000000101100
40T	00000000000000000000000000000000000000000000000000
41T	00004130021400015011000001001000033211000000110010
42T	00001010013200002000000000000000010000000000000000
43T	10101110013200002000000000000000000100000000000000
44T	00001010013200002000000000000000000100000000000000
45T	21011110014100001000000020000000000100000000000000
46T	00000000000000000000000000000000000000000000000000
47T	11112120013400003000000000000000001120000000000000
48T	10112120013400003000000000000000001120000000000000
49T	10112120013400003000000000000000001120000000000000

Table 8 (continued)

	ATTRIBUTE
	000000000000000000000000000000000000000000000000000000000
	000000000111111111122222222223333333333444444444455 5
ITEM	123456789012345678901234567890123456789012345678901 2
50T	215000000010000000000000000000000000000000000021133120
51T	215010000020000000000000000000000000000000000021143020
52T	215040000020000000000000000000000000000000000021133120
53T	215040000020000000000000000000000000000000000021133120
54T	215030000010000000000000000000000000000000000022133120
55T	215040000010000000000000000000000000000000000011133121
56T	214010000020000000000000000000000000000000000011033120
57T	215000000020000000000000000000000000000000000011133120
58T	215000000010000000000000000000000000000000000021133120
59T	215000000020000000000000010001000000000000000031133120
60T	215000000010000000000000000000000000000000000021133120
61T	215000000120000000000000010000000000000000000021033020
62T	114000000010200000000000000000000000000000000011022000
63T	214000000010000000000000000000000000000000000011022010
64T	214000000011100000000000000000000000000000000011022000
65T	214000000000000000000000000000000000000000000011122000
66T	000000000000000000000000000000000000000000000000000 00000
67T	120500000000000000000000001300000000000000044233011
68T	120500000000000000000000001200000000000000044333011
69T	110500000000000000000001001200100000100000044333011
70T	110500000000000000000001001200000001000000034333010
71T	110500000000000000000000001300000000000000033333011
72T	020500000000000000001000000120010000000000033323010
73T	020400000000000010000100011023011000001000000543330 20
74T	010400000000000100000000002300000000000000043332110
75T	111200000000000000000000000000000000000000021122000
76T	111200000000000000010000000000000000000000021122000
77T	112100000000000001000000000000000000000000020022110
78T	112100000000000000000000000000000000000000020011000
79T	112000100000000001000000000000000000000000030032220
80T	112000000000000000000000000000000000000000020011000
81T	111300000000000000000000000000000000000000032133110
82T	011200000000000000000000000000000000000000032111000
83T	111300100000000000000000000000000000000000052233120
84T	112300000000000000000000000000000000000000042201000
85T	000001500111211310000000000003000000000000000011120
86T	100000503211000310000000010000300000000000000011110
87T	000000540000010210000000000003000000000000000001110
88T	000003500001211210000000000002000000000000000001110
89T	000000400000100200000000000002000000000000000101100
90T	120000500110000210000000000002000000000000000001010
91T	010000500122000210000000000002000000000000000001110
92T	110000203200000100000000000001100000000000000011110

Table 8 (continued)

	ATTRIBUTE
	0000000000000000000000000000000000000000000000001111
	5555555666666666677777777778888888888999999999990000
ITEM	3456789012345678901234567890123456789012345678901234
50T	0001212001340000300100000000000000112000000000000000
51T	0000212001340000300000000000000000112000000000000000
52T	0000211001340000300000000000000000112000000000000000
53T	0000211001340000300000000000000000112000000000000000
54T	0000312001350000300200000000000000112000000000000000
55T	1101211001340000300000000000000000112000000000000000
56T	0000211101340000200000000000000000112000000000000000
57T	1001211001340000300000000000000000112000000000000000
58T	1101212001350000300000000000000000112000000000000000
59T	1101212001350000300000000000000000112000000000000000
60T	1101211001340000300000000000000000112000000000000000
61T	0000112001350000300000000000000000112000000000000000
62T	0000101000340000100100000000000000112000000000000000
63T	0000101001340000200000000000000000112000000000000000
64T	0000111001340000200000000000000000112000000000000000
65T	1000112001340000200000000000000000202000000000000000
66T	0000000000000000000000000000000000000000000000000000
67T	1102144011150000300000001000000000112000000000100000
68T	1102144011150000300000002000000000112000000000100000
69T	1101144011140000310000000000000000112000000000100000
70T	0001144011241000320000000000000000112000000000100000
71T	0101144011140000300000001000000000112000000000100000
72T	0000144111140000320000000000000000112000000000110000
73T	0011244111140000410000000000000000212000100000110110
74T	0010144011140000310000000000000000112000000000100000
75T	0000122000240000210000000000000000012000000000000000
76T	0000122000241000220000000000000000012000000000100000
77T	0000201001330010201100000000000000001000000000000000
78T	0000000001330000200000000000000000001000000000000000
79T	0000201001340000300000000000000000001000000000000000
80T	0000011C00330000200100000000000000001000000000000000
81T	0000101011340000300000000000000000001000000000000000
82T	0000000001230000200000000000000000001000000000000000
83T	0000101002240000300000000000000000102000000000100000
84T	0000001001240000300100000000000000102000000000100000
85T	0000301000110004201100010200000001001000000000000000
86T	0000312001110004300100110200000001001000000000000000
87T	0000300000110004300000010200000000001000000000000000
88T	0000300000110004201100110200000001001000000000000000
89T	0000310000100003201000010100000000001000000000000000
90T	0000300000110004200000010200000000001000000000000000
91T	0000300000110004200000020200000000001000000000000000
92T	0000211000110001200000010100000000111000000000000000

Table 8 (continued)

ITEM	ATTRIBUTE
	000000000000000000000000000000000000000000000000000000000000
	000000000111111111122222222223333333333444444444455
	123456789012345678901234567890123456789012345678901
93T	000000301000011100000000220111110000000000000000011120
94T	010000311000000210000000110221210000011000000000111110
95T	000000000000000000000000000000000000000000000000000000000000
1A	101100000000000000000000000111000000000000000011152110
2A	001100100000000000000000000011000000000000000052133230
3A	001100000000000000000000100321000000000000000042232130
4A	100000000000000000000000000000000000000000000020011510
5A	001000000000000000000000000000000000000000000020025110
6A	000010000000000000000000000000000000000000000021011150
7A	000100000000000000000000010000000000000000010510000
8A	000200000000000000000000001000000000000000015011010
9A	000000000000000000000000000200000000000000011100000
10A	000100000000000000000000000100000000000000013011000
11A	000000000000000000000000000100000000000000002000000
12A	000000000000000000000000000100000000000000002000001
13A	000000000000000000000000000200000000000000003001001
14A	000000000000000000000000000000000000000000001000000
15A	000100000000000001000000000000000000000000000000000000
16A	000000000000000000000000000000000000000000001000000
17A	000000000000000000000000000000000000000000000000000C
18A	000000000000000000000000000000000000000000000000102
19A	000000000000000000000000000000000000000000000000002
20A	000000000000000000000000000000000000000000000000003
21A	000000000000000000000000000000000000000000000000001
22A	000000000000000000000000000000000000000000000000001
23A	012000000000000010000000000000000000000000001133110
24A	123000010000000000000000001000100000100000011122110
25A	224100110000000000000000010110010000010000032223110
26A	021500000000000000000000010130010000010000033333110
27A	331111020100000000000000000000010000022100000 1023210
28A	331311020000000000000000000000010000020000001023210
29A	332101220000000100000000000000110000011000021023320
30A	241112230000000100000000110000120000144210000011100
31A	210000000130000100000000000001000000010000001023111
32A	330040010110000000000000000001010000010000001023111
33A	330030000320000100000000110011010000020000002033111
34A	320040010200000000000000110011010000010000002033210
35A	211030000010000000000000000000000000010000012033310
36A	414000000130000000000000200020000000100000022033111
37A	212000000230000000000000200010000000000000011022110
38A	301000000041000000000000000000000000000000011022110
39A	201000000032200100000000000000000000010000011012000
40A	111000100035010100000000000000010000010000000011010

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777888888888999999999990000
ITEM	34567890123456789012345678901234567890123456789123
93T	00004122011100043010000202002000021110000000000000
94T	00003220201100012000000101000000001110000000100001
95T	00000000000000000000000000000000000000000000000000
1A	00004230012200213111000000001010011110000000000000
2A	00001230011300013010000000001010012111000000100000
3A	00003340111300003000000000000000002120000000100000
4A	00003020021200113011000000002020022111000000000000
5A	00002020022200113002000010001010012121000000000000
6A	00002010012200112011000000002000021110000000000000
7A	00101110101200002000100000000010011110000000100000
8A	00101110012200002001100000000012012121000000000000
9A	00500010001100001000000000000002001110000000000000
10A	01310110002100001000100000000002002120000000000000
11A	01110110002111000020100010000101110020000000000000
12A	12230110001000000000000000000001000030000000000000
13A	12330110001000000000000000000000000030000000000000
14A	01110000002111101112000010000101110010000000000000
15A	00100000002110200101011100100001110010000000000000
16A	01110000002100001000000000000000000020000000000000
17A	00000000001000001000000000000000000010000000000000
18A	22010000003100001000000000000000001110000000000000
19A	42020000003100001000000010000000001110000000000000
20A	21010000003000000000000000000010011100000000000000
21A	13050000003100001000000000000001[illegible]1120000000000000
22A	15030000003100001000000000000001001120000000000000
23A	11011110015300101000000000000000001120000000000000
24A	01011210115400011000000000000000001120000000000000
25A	00012120113500013001000000000000002231000000200000
26A	11011440113500004100000010000000002230000000200010
27A	00002111112400013000000000000020000223000001001100010
28A	00002010112400012000000000000030000112000000000000010
29A	00002110212400013000000100000200002231000000100010
30A	00002110211400023000000201000300003331010110110010
31A	11111110013100003000000000001000001130000000000000
32A	11012120012200003000000100000200002230000000100000
33A	11112220013200003000000100000000002231001100100010
34A	11012120013300003000000100000000002130000000100000
35A	01014021023300003003000000000000001130000100100000
36A	11013120022300004001000000001000002220000100100000
37A	11012120012300003000000000002000002220000100100000
38A	11013112033300003000000000002000001120000100100000
39A	00001110012300002001000000000000001120000000000000
40A	00002011002200002000000011000000002120000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
41A	11100014003000010000000000000000000000100000010011000
42A	11100110003020000000000000000000000000100000000011000
43A	10000000001100000000000000000000000000000000001022111
44A	11000000001000000000000000000000000000000000001024111
45A	21000000000000000000000000000000000000000000002022002
46A	51100010101000000000000003010100000001000000220434 40
47A	02100121000011110000000011120012000002000000000210000
48A	01000050100011031000000000110031000000000000000010000
49A	01000121011010010000000012120001000002110000000010000
50A	12000242001111110000000000000011000002210000000010000
51A	00000000000001200000110000001000000000100010002013111
52A	10000020000004510000100010000111000001210100010022110
53A	10000000000004500000100000000000000011001000 1022120
54A	20000000000004500000100001010201100002100000021334 50
55A	10000010000104510000100000000001000001000100010022120
1J	10000000000112010000000000010000000001000000000011000
2J	10000000000103310000100100000000000001000000000011000
3J	10000000000103410011222200000000010000100030000011110
4J	10010010100000010000000001011100000000000000000011001
5J	10010000002100010000000000000000000000000000000011001
6J	10010000002100000000000000000000000000000000000011001
7J	10100000001110000000000000000000000001000000000011001
8J	10000000001010000000000000000000000001000000000011001
9J	10201000013000000000000000000000000000000000000011001
10J	20200000013000000000000000000000000001000000000011000
11J	10100000013000000000000000000000000001000000000011000
12J	10100000013100000000000000000000000000000000000011000
13J	10101000013100000000000000000000000000000000000011010
14J	00100100003401000000000000000000000001000000000011000
15J	20100000102000000000000001000100000001000030000 11010
16J	10100000003000000000000000000000000001000000000011110
17J	10100000003000010000000000000000000000000000000011000
18J	00000000002002300000000000000000000001000000000011000
19J	00000000001050000000000000000000000001000000000011000
20J	21002000031000000000000000001000000010000000 0012001
21J	21002000032000000000000001000100000001000000000012001
22J	23102000011000000000000000000000000001000000000012100
23J	21002003000000010000000000000000000001000000000012110
24J	21103000011000000000000000000000000000000000000011110
25J	21101000011000000000000000001000000000000000000011110
26J	21001000011000000000000000000000000000000000000011000
27J	20101000001000000000000000000000000000000001000011110
28J	11101000001000000000000000000000000000000000000011100

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
ITEM	34567890123456789012345678901234567890123456789123
41A	00001000002200002000000001000000002120000000000000
42A	00001010002200002001000000000000000112000000000000
43A	11012110014100001001000000000000000113000000000000
44A	32011120015200101000000000000000000113000000000000
45A	22031120014200001000000020000000001130000000000000
46A	00004030032300014001000000002000004231010100111011
47A	00003110102300021020000200000000011120000000110000
48A	00003220012100031010000201000000011120000000010000
49A	00003221121200051000000411010100002221100010111000
50A	00003111111200052020000412000100012231000010111001
51A	21011110012035000131100020000000021120100010111201
52A	00002110331024010051000120000000042221101010111311
53A	11002110031034000051000010000000043321101010121312
54A	00014021041022000020000000000000053331111010121322
55A	00002010021024000051000020000000042121001000111311
1J	11011212012100000000000050000000000110000000000010
2J	11011111112104000000100050000000031110000000000010
3J	10002111121144000144200000110111241111100000111311
4J	11010321002100001000000131000000000010000000000000
5J	11011111002100001000000100000000000010000000000000
6J	11011111002100000000000000000000000010000000000000
7J	11011111002100000000000010000000000010000000000000
8J	11011111002100000000000010000000000010000000000000
9J	11011110002100001000000100000000000010000000000000
10J	11011110002100012000000100000000000010000000000000
11J	11011110002100012000000100000000000010000000000000
12J	00011111002100011000000100000000000010000000000000
13J	01011102002100012000000100001000000010000000000000
14J	00001101001100011000000100000000000010000000000000
15J	00002013011100011000000100004000000110000000010000
16J	00001102012100011001000100000000000010000000000000
17J	00011100002100011000000000000000000010000000000000
18J	00001010012101011020000000000000001001000000000000
19J	00001001012100011002000000000000000010000000000000
20J	11011110002100012000000100000000000010000000000000
21J	11011110002100012000000100000000000010000000000000
22J	11002010012200013000000100000000000010000000000000
23J	00002011012100013000000100000000000010000000000000
24J	01002010012100012000000000000000000010000000000000
25J	00002010012100012000000100000000000010000000000000
26J	00001010012100012000000000000000000010000000000000
27J	00001010012100012001000100000000000010000000000000
28J	00001010002100011000000100000000000010000000000000

Table 8 (continued)

	ATTRIBUTE
	000000000000000000000000000000000000000000000000000000
	000000001111111111222222222233333333334444444444555
ITEM	123456789012345678901234567890123456789012345678901234567890123
29J	310000000000000000001000000000000000010000000000111000
30J	220310110000000000001000000000000000010000011012010
31J	331010110000000000001000000000000000010000011012110
32J	210010140000000100001000000000010000010000000011110
33J	210010311000011110001000100000110000010000000101111O
34J	211011100000000100001000000000010000010000000011000
35J	100000000320000000001000000010000000010000000011000
36J	200000000320000000001000000000000000010000000011000
37J	100000001320000000001000000100000000010000000011000
38J	110010001310000000001000000110000000010000000011000
39J	110100001100000100001000000010000000010000000011000
40J	110010100711000000100100000000000000010000000011100
41J	110000000110000000001000000000000000010000000011100
42J	110000000010000000001000000000000000010000000011100
43J	100000000000000010000100100000000000010000000011110
44J	100000000800000000001001000000000000010000100011110
1R	000000002100000114210000001001011111000000000031210
2R	000000104100000110000000010002110000000000000032220
3R	000000000000000014100000002000011010000000001132310
4R	000000001000000000010000000000000000000000000011100
5R	000000000000000000000000011100010000000000000011010
6R	011000000000000004000000000000000000000000000011100
7R	000000010000000003210000000000111010000000000010000
8R	010000010000000000110000010001011000000000000011100
9R	010000101100000441000000000003000000010000000022210
10R	000000000000000433000000001000300000001000000021210
11R	011000010000000222000000001000100000001000000121100
12R	000000000000000330000000001000102000002000000000000
13R	000000000000000340000000001000212101014110000000000
14R	000000000000000114421010001000014443101010000010100
15R	000000000011011101510000001000014444212230000000000
16R	000000000000000005212200000000244141011210000000000
17R	000000000000001110052011000000003441520212200000000000
18R	000000000000000002431210000000004323000000000000000
19R	000000000000000002511110001000045330000000000000000
20R	010000010001011110310000000000004232000000000000000
21R	000000000000000002000000000000033330000000000000000
22R	000000000000000000000000011110001000000000000111000
23R	000000000001001022000000102000011000001100000000000
24R	000000000000000000000000001000210010011000000100000
25R	010000014200000110000000120102110000000010100001O010
26R	000000110000000221000000001000310000001000000000000
27R	000000000000000330000000001000410000003110000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
ITEM	34567890123456789012345678901234567890123456789123
29J	00001010002100021000000000001000000100000000000000
30J	00001220111300023000001010001000010100000000000000
31J	11002120112300023000001010002000010100000000000000
32J	00003111111200023000001010002000010100000000000000
33J	00003021111200023010000101001200001111000000000000
34J	00001110001100023000000101000100000101000000000000
35J	01110220002100021000000100000100000010000000000000
36J	01110220002100021000000100001100000010000000000000
37J	00011221002100021000000100001000000010000000000000
38J	01111220002100021000000100000100001010000000000000
39J	11011220002100021000000110000000000010000000000000
40J	00001110012100022000000100000110001111000000000100000
41J	00001110012100021000000000001100001111000000000100000
42J	00001110002100021000000000000100000010000000000000
43J	00001011011100021001000000001100001111000000000100000
44J	00002011011100022000000000001100001111000000000100000
1R	00003000010000311110233102221210310010000000000000001
2R	00003011010000101000101110310310020101000001001000001
3R	00003000010100502100022001200110101010000000000010001
4R	00002211000100001000100001101000201000000000000000001
5R	00001312000100001000000000000000001010000000000000001
6R	00002000000100402000110000100100101000000000000010001
7R	00001000300100202200110000311122111010101000000000001
8R	00002211300100003000100000302113101110000000000000001
9R	00003000010100101000004103000100101010000000000000001
10R	00003000010100401100004103000100101010000000000000001
11R	00002000000100303000002001000000001010000000000000001
12R	00002000000000010100003002000000102111010000001000l
13R	00002000000000001000041020000000022210101101110111
14R	00003000000000410110142112320310221120100010100000l
15R	00003000000000100100142102320100222321110220221021l
16R	00000000200021200211321002431313421121101110100l101
17R	00000000200010100100231001420103422321111220221021l
18R	00001000200021210211231101221313321000001100000000
19R	00001000200010100000141001320101311111000l1000000100
20R	00001000200000111010131103110210231111000000000100
21R	00001000200000000000040000000000101110010100000000
22R	00001321000000000000000000000001l[illegible]11000000000000000
23R	00003000000000210010011001100020021110000000000000
24R	00000000400000000000000000000000011200000000000000
25R	00003011010000001000100203102000002121000110100000l
26R	00002000100000201000013101000100001010000000000000
27R	00002000000000000000141030000001022210000001000101

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444455
ITEM	12345678901234567890123456789012345678901234567890
28R	00000000000000000142110000000001232210100100000000
29R	00000810000101100141110000100001332201100100000000
30R	00000000000000100010131100000000121021100030000000
31R	00000000000000000201020000000001220100000100000000
32R	00000000000000011400000001520002113000000000000000
33R	00000000000000012400000001410002101000000000000100
34R	00000000000000001400000010410012100000011000000000
35R	00000010010000044100000000200051000000210000000000
36R	00000000010000043000000000100041000000310000000000
37R	00000000000000011210000000200012211101120000000000
38R	01000000000001111030000010110112311122322000000000
39R	01000001100001021020000010000112321223443000000000
1P	00000000000011100210111000000001100001000200000001000
2P	00000000000010000011523100000001100101000400000001010
3P	00000000000000100110100000000001100001000100000000000
4P	00000000000000010000000000000000000000000010000000000
5P	00000001000001000000110000000001100102100300000000000
6P	00000000000001000010110000000000010010200020000000000
7P	00000000000010000010110100000001100102110300000000000
8P	00000000000000000011002000000000110010111030000000000
9P	00000000000010000011012100000000110010311130000000000
10P	00000000000000000010030000000000100101001300000000000
11P	00000000001101111142411100000002321321000200000000000
12P	00000000000000100041121000000002421211100300000000000
13P	11000000001010000044111100000002220411001200000000000
14P	00000000000000000054131000000001320421201400000000000
15P	01000001111111111151121100000002431422222300000000000
16P	00000000000000100041341100000002320413211400000000000
17P	10000000000103400010110000000000110102100200000111110
18P	00000000000000000040132000000002320423321400000000000
19P	00000000000000000041242000000002420422321400000000000
20P	00000000000000000051132000000002430532422300000000000
21P	00000000000000000041242000000001320322211400000000000
22P	00000000000000000041242000000002320422321400000000000
23P	00000000000000000031223100000001210220002401000000000
24P	00000000000000000031134100000001210210001400000000000
25P	00000000000000000110111000000000110100000200000000000
26P	00000000000000000100110000000000100100000100000000000
27P	00000000000000000100110000000000100100000200000000000
28P	00000000000000120002132210000000111020100020000000000
29P	00000000000000100002011100000000111010100020000000000
30P	00000000000000010002331210000000011010000020000000000
31P	00000000000000000001121110000000011010000020000000000

Table 8 (continued)

ITEM	ATTRIBUTE
	00000000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
	34567890123456789012345678901234567890123456789012345678901234567890123
28R	00001000100010100210231101220203311020201010100000
29R	00001000200010001120132101220111232121100010110010
30R	00000000100022000131100000110000331111110010111 3110
31R	00000000100010100100110000210100111111111000101011 1
32R	00004000000000520100012100110100101120000000010000 1
33R	00004000000000510200002000000100001120000000000000 1
34R	00003000000000510100001000000000001120000000010000 1
35R	00003000000000310100004203000100101121000000000000 1
36R	00003000000000000000041030000000022210100001100101
37R	00003000000000300110112201110100102221000000010001 1
38R	00002000000000000000124404130100223331010220120012 1
39R	00002000000000000000242041311112233310104202200221
1P	00001100201042200141000000000100111121003000101200 0
2P	01011100201054100434000000000100110121001000100300 0
3P	00000000102021211111000110011000010011101000110000 0
4P	00000000001011100021000010011000110011101000110000 0
5P	00001100100021000001300000140010213121501020121111 0
6P	00001000100011010000100101150000112121411020121121 0
7P	00001100100011010010400100140010313122411020121111 0
8P	00000000000010000000100000140000102222411120131111 1
9P	00000000000010000000200101150110213222411230131011 0
10P	00000000000011000000100000140000202121401020121111 0
11P	00000000200042210512411111421401421222010101103110
12P	00000000300031200311211001420201221121101000001010
13P	00001000200141000501400000310411302231201111011110
14P	00000000200021000300100000420401213222201120111211 0
15P	00000100200031000101500000210111503331311220221422 1
16P	00000000200022000211201201210200523331211120221422 1
17P	00001010110024000141000010100000153331201120221422 1
18P	00000000200020000000000000220000103331301120120112 1
19P	00000000200020000100000000320100103331211120121112 1
20P	00000000200020000000110001220100103231101120121112 1
21P	00000000200021000100000000320100103221201110121212 0
22P	00000000200020000100000000320000203331201120121212 1
23P	00000000100031000201100000101034102231111220210212 0
24P	00000000200031000200000000210201002121002110110222 1
25P	00000000001120210121100101010100100001001000200000 0
26P	00000000001111211111111110111011111000110401020010 0
27P	00000000000011101010200001140010111101401020110120 0
28P	00000000100033000242102111211200341111211020221321 1
29P	00000000100011110110012101110100121111101010110110 0
30P	00000000100042101504100100112401000011011010111210 0
31P	00000000100041100401000000211123000010000010100200 0

Table 8 (continued)

	ATTRIBUTE
	000000000000000000000000000000000000000000000000000000000000
	000000000111111111122222222233333333334444444444555
ITEM	123456789012345678901234567890123456789012345678901
32P	00000000000111111020111100000000210210000200000000000
33P	00000000000000010001010000000000010000000020000000000
34P	00000000000000010001010000000000010000000020000000000
1G	13111210000000000000000001010000000003100000000000000
2G	14111310000000000000000001010000000003200000000000000
3G	33123100000000000000000000000000000002000000010231 11
4G	34112200000000000000000000000000000002100000010232 11
5G	33114100000000000000000000001000000010000000202321 1
6G	23211320000000010000000001000000000001100000000110 00
7G	13230210000000000000000000010000000010000003222211 0
8G	01040000000000000001000000010000000010000001211101 0
9G	03001000410000020000000003021321000001101000000212 20
10G	04001001210000020000000011010321200123234000000000000
11G	04101000000000011030000000000011433311111000000000000
12G	11002024000000000000000001010000000002100000000000000
13G	11002025000000000000000001010000000003210000000000000
14G	21002004000000000000000000000000000002000000000121 10
15G	21002005000000000000000000000000000002100000010232 10
16G	21003005000000010000000000000010000000100000001033211
17G	21000025000000010000000000000001000000110000021122210
18G	10001025000000010000000001000000000001000000000110 00
19G	01001004300000020000000002021211000001001000000112 20
20G	01000004100000020000000000102212001233240000000000 0
21G	01000005100000021030000000000011433311121000000000000
22G	32003011142000010000000011011210000002001000020231 12
23G	31103011022000010000000011001100000001000000010332 11
24G	31004101022000010000000011000100000001000000020232 11
25G	31300010013000000000000012000200000001000000220331 21
26G	21300000023000000000000012000100000001000000110221 11
27G	30100000014000000000000000000000000001000000110221 11
28G	21200000013010000000000000000000000001000000110120 11
29G	10100002004320010000000000000000000000000000000110 10
30G	21001010032000000000000001010000000002000000000110 00
31G	21001010022000000000000001010000000002000000000110 00
32G	21001110022100000000000001010000000002000000000110 00
33G	00000000310000000000000021012200000001001020000010 00
34G	00000000100000000000000010011100000001000000000110 01
35G	02001000342000020000000021001311100134334010000000000
36G	02001000222100010000000011000211200134334000000000000
37G	01001000132000011030000000100011143331211100000000000
38G	02001000012100011030000000000011433311111000000000000
39G	02001000431000020000000013011311100021110000000111 20
40G	20010000000101000000000000000000000000010000000101 2101

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
ITEM	34567890123456789012345678901234567890123456789123
32P	00000000100011000000400000001110501110101010110311O
33P	00000000000012222222222222222222222222222202222222
34P	00000000000011111111111111111111111111111101111111
1G	00003110111400042000000201000100001111000000000000
2G	00002110111400023000000201000100002221000000100010
3G	00002110012400013000000100000100001121000000000000
4G	10002110112400013000000100000200002221000000100010
5G	11012110012300002000000100000200002220000000000000
6G	00002110102400033000000201000100002211000000100000
7G	10002330112500013000000100000000001221000000110000
8G	00001320002320002200000000000000001120000000100000
9G	00003010000200001000000103000000002221000110110011O
10G	00002000000200011000011204010100003322010320210012l
11G	00003000000100011000041203000100002221010110110011l
12G	00003110111200042000000201000100002111000000000000
13G	00002110111200023000000201000100002220000000100010
14G	00002110012200012000000000000100001120000000000000
15G	00002011012200013000000100000100002221000000100000
16G	11102121012200003000000100000200002221000000000000
17G	00002111112300013010000101000100002221000000100000
18G	00002110101200033000000201000100002221000000100000
19G	00003011000100001000000103000100002221000110110001O
20G	00002000000100010000011204010100003322010320210012l
21G	00003000000000001100004120300000000222101011011001l1
22G	21111220012200003000000101001000002221000100100001O
23G	11012120013300013001000001001000002121000000100000O
24G	21012121013100003000000000000200002221000000100000O
25G	11013120022300003000000000002000002220000100110000O
26G	11012120022300003000000000002000001220000000110000O
27G	11012112023200003000000000002000001120000000110000O
28G	00001110012200002000000000001000001120000000100000O
29G	00001011012100002001000000000000001221000000010000O
30G	00101221011100042000000301000100002221000000100000O
31G	00002111021200042001000201000100002121000000011000O
32G	00002111011200042000000301000100002221000000011000O
33G	00000231001000000000000011000310000121000001101100011
34G	11001221003000100000000000000000001111000010000000O
35G	00002010000000000000000304011000003322000320210012l
36G	00002010000000000000011304010000003322000320210012l
37G	00003000000000000000030204010100002321000110110011l
38G	00003000000000010000030204010100002321000110110011l
39G	00003011000000000000001204002000002321000210110011l
40G	11021210004000000000000050000000001230000000000010

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
41G	20010000000101000000000000010000000001000000001012001
42G	10020000000001000000000000001000000001000000001012101
43G	00000000000102010000000000000011100123224000000000000
44G	00000000000102010030000000000004333111110000000000000
45G	10010000001000000000000000001000000001000000001012002
46G	10020000000000010000000001001000000001000000001012002
47G	10019000000000000000000001010000000001000000000011000
48G	00000000000000001000000001100011111001232340000000000
49G	00000000001000011030000000000000433311111100000000000
50G	00000120000201010000100000010000000002100000000000000
51G	00000030000000011000100011011111000002110000000000000
52G	00000020000000021000000032122121000002210000000000000
53G	00000020000100010000100010000110200123334000000000000
54G	00000010000100011030100000000010433311111100000000000
55G	00000010300000022000000013010221100001110000000011120
56G	00000010000000010000100010021000000003100000000111000
57G	00000000300000000000000122012200000000100305000010000
58G	10000000100000000000000114000300000001100405001022330
59G	00000000000000000000001100001002000001003143020111111
60G	00000000000000000010000010000001200121124043000000000
61G	00000000411000010000000113011301100011104051000100 20
62G	00000000100000000030000100000001432301112041000000000
63G	00000010000104510000100012010011000002311000000000000
64G	10000000000114510000100001000000000002100100010112 20
65G	00000000000124510000100000000000100003110100000001 10
66G	00000000000001200000200000000000000010001000101211 1
67G	00000010000112210000100001010000000002110000000000000
68G	00000030000315311000100011010010000002110000000111 10
69G	00000051000104411000100000000011000001100000000111 10
70G	00000010000114411040100000000114333121110000000000000
71G	00000000002144200101000000000112001233330000000000000
72G	00000000000000003211000002000013331000000000010100
73G	01000001000111110250000000100001443421123000000000000
74G	00000001000000000340000000310002542111000000000000000
75G	00000000000000000440000000410001455101000000000000000
76G	00000000000000000420000000410002312100000000000000000
77G	00000000000001000151111000000002431410000100000000000
78G	00000000000000000520000000300002323100000000000011100
79G	00000000000000005310100000010005100000020000000000000
80G	00000000000000004200000000000014100001152100000000000
81G	00000000000000002430000000020003100000000000000010000
82G	00000000000000002420000000120003100000000000000000000
83G	00000000000000002211010000000002210000000000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999999990000
ITEM	34567890123456789012345678901234567890123456789012345
41G	11011211003000000000000050000000011300000000000010
42G	11020211004100000000000050000000012300000000000000
43G	00001000000000000000001510100000033220003202100121
44G	00003000000000000000040141000000002221010110110111
45G	22020111004100001000000110000000001130000000000000
46G	22020220004200001000000110000000001230000000000000
47G	11010220003100010000000121000000001121000000000000
48G	00001010000000000000000224010000003322000320210012l
49G	00003000000000000000040123000000002221010110110011l
50G	00001111001000020000000211000000002221000000100010
51G	00001211001000020000001301000000002221000000110010
52G	00002310001000000000002201000000002221000001110011
53G	00002000000000000000002313010000003322010320211012l
54G	00003000000000000000041202100000002321010110111011l
55G	00003011000000000000000111100000000222100000000000l1
56G	01011310001000000000001110000000002331000000110112O
57G	00001344000000000000000010005001002221000320110012l
58G	01003144041000002000000000005000003321010430110013l
59G	13220011201000001000000000003055003321001220210011l
60G	00001000200000001000020000004044003321110420210012l
61G	00003024010000001000000000004013003321010320110012l
62G	00002002100000000000130000104022103321010110110011l
63G	00002011110012010040000111000000053321000110111311O
64G	00002011020023000051000010000000053321000110111321l
65G	00001010010013000050000010000000152321100110111311l
66G	11001010011035000040000000000000021120000000001300O
67G	00002211000012040030000210000000322211000000112111
68G	00003012010012040040000110000000042221000010011211l
69G	00003110110113020040000000000000042221000000111211l
70G	00003000000012010040040011100000143221010110111211l
71G	00002000000001000020001112010000043321010320211312l
72G	00003000000010410210120111110200111111000000000l0000
73G	00003000000000210000152102321111223322000320110012l
74G	00003000000000200000140001310000212221000000010000l
75G	00004000000000400000040000200000202121000000001000l
76G	00003000000000400000010000100000001120000000001000l
77G	00000000300000200101210000320201212221000100010010O
78G	00003000300000400000000000200000001120000000001000l
79G	00002000000000200100003101000200101121000000000000l
80G	00002000000000000000005202000000103221000110101011l
81G	00003000000000400100003001000100001120000000000000l
82G	00003000000000200000004100000100001121000000000000O
83G	00001000200000200200103000000100001121000000000000O

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
84G	01000001420000023100000013110311100001111000000111200
85G	00000001000000003300000000200011110000110000000101000
86G	00000000000000000000000000000011000001000000000000000
87G	00000000000000000400000000100000000000000000000010000
88G	00000000000000004100000014200011010000000000000000000
89G	00000000000000101141110000000101101000001000000000000
90G	00000000000000010003100000001000000001000000010111000
91G	00000000100000000024000011000000222231003120000000000
92G	00000000000000000021142000000000100112010300000000000
93G	00000000000000000033343000000000210112001300000000000
94G	00000000000000034200000000210031000000100000000000000
95G	00000000000000011001000000000010000001000000000000000
96G	00000000000000024100000000100031100000100000000000000
97G	00000000000001001000100000000001020012323300000000000
98G	00000000100000000131100000000001444312211000000000000
99G	00000000000000011241000000000001444311111000000000000
100G	00000000000000000000301401000000000000000011000011120
101G	00000000000000000001101000000011000011101000001000
102G	00000000000000000201100000000011001011102000000000000
103G	00000000000000000231311000000011102111014000000000000
104G	00000000000000000100310000000011000010002000000000000
105G	00000000000000000101310000000011001011003000000000000
106G	00000000000000010010110000000011200101211100000000000
107G	00000000000010000021321100000001100101011300000000000
108G	00000000000000000020111000000000200133334200000000000
109G	00000000000000001040010000000001433411111000000000000
110G	10000000000000000001002000000000000000000010000011110
111G	00000000000000000001000000100000000011000000000000000
112G	00000000000001000030000000000000333311111000000000000
1C	10010000000000000000000000001000000000000000000000000
2C	00000000000000000000000000000000000000000000000000000
3C	00000000000000000000000000000000000000000000000000000
4C	00000000000000000000000000000000000000000000000000000
5C	00000000000000000000000001000000000000000000000000000
6C	00000000000000000000000000000000000000000000000000000
7C	00000000000000000000000000000000000000000000000000000
8C	00000000000000000000000000000000000000000000000000000
9C	00000000000000000000000000000000000000000000000000000
10C	00000000000010000000000000000000000000000000000000000
11C	00000000000000000000000000000000000000000000000000000
12C	00000000000000000000000000000000000000000000000000000
13C	21310000000000000000000000000000000000010000010111010
14C	00010000000000000000000000011000000001000000000201000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999999990000
ITEM	34567890123456789012345678901234567890123456789012345
84G	00003011000000000000001102001000002221000110101000
85G	00003000000000300000012001100010002221000000010001
86G	00000100210000000000000000000200022200000000010001
87G	00002000000100301000000000100000001120000000010000
88G	00004000000000400100001000100000001120000000010001
89G	00002000100020100400001000210400002321010000100001
90G	10001111012010000200000000100200001121000000000001
91G	00002112100010000100010000412200002221000210110001
92G	00000000100010000000000000330000003322211110210211
93G	00000000000020000300100000420301002321011110211211
94G	00003000000000400200003000010100002221000000100001
95G	00000000000000000000001100140100003322110110210010
96G	00002000000000100100003100120100002221000000000001
97G	00001000000000000000002201140200003322110320211012
98G	00002000000010000000040000310100003322110110111010
99G	00003000000000100100040000330100002222110110111011
100G	00002113011044001115000000001000111221001110110201
101G	00001320110032000111500100020010302321201110110311
102G	00001000100022000100500100120000502221211110111312
103G	00000000100032000100210000420201312321201110111212
104G	00000110100022000000200100340000202211401100111211
105G	00000000100033000110200000110000423321201110221412
106G	00001000000021000100011000210100102322111110121311
107G	00000000100043000312100000311134212321001110211302
108G	00001000000011000100311100220100313322110420221312
109G	00003000000011000000140000320000222221110110111110
110G	00001112011015000001000020001000001220000110110001
111G	00001220000014000000400120000001012221000110111001
112G	00003000000002000000140020100000012221000110111011
1C	00110110002000001000000120000000000010000000000001
2C	00000000001000000000000000000000000000000000000001
3C	00000000001000000000000000000000000000000000000001
4C	00000000001000000000000010000000000000000000000001
5C	00002111000000000000000000000000000000000000000001
6C	00010000000100000000000000000000000000000000000001
7C	00010000000000000000000000000000000000000000000001
8C	00000000101000000000000000000000000000000000000001
9C	00010000001000000000000000000000000000000000000001
10C	00010000000000000000000000000000000000000000000001
11C	00010000000000000000000000000000000000000000000001
12C	00000000000000000000000000000000000000000000000001
13C	00001120101200001000000000000000000000000000000001
14C	00001201011000000000000000000000000000000000000001

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000000000000
	00000000011111111112222222222333333333344444444445555
ITEM	12345678901234567890123456789012345678901234567890123456789012
15C	00000000000000000000000000001000000001000000001100000
16C	00001000000010000000000000000000000001000000000110000
17C	10000003000000000000000000000000000001000000000111010
18C	00000100001201000000000000000000000001000000000100000
19C	00010000000000000000000000000000000001000000000100000
20C	10110001000100000000000000000000000001000000000100000
21C	00100001000000000000000000000000000000000000000000000
22C	00000000000000000000000000000000000000000000000000000
23C	00000000000000000000000000000000000000000000000000000
24C	00000000000000000000000000000000000000000000000000000
25C	00000000000000000000011000000000000000000000000000000
26C	00100000001110110101100000000001000000000000000000000
27C	00000000000010000100000000000001000000000000000000000
28C	00111000000010101100000000110000000000000000000100000
29C	00101101111111111011110010000000000000000000000000000
30C	00000000000000000100000000000000000000000000000000000
31C	01000000000111100010100000000001000010001000000000000
32C	00000000000000000100000000000000000000000000000000000
33C	00000000000000000000000000000000000000000000000000000
34C	00000000000000000000000000000000000000000000000000000
35C	00000000000000000100000000000000000000000000000000000
36C	00000000000000000000000000000000000000000000000000000
37C	00000000000000000000030000000000000000000000000000000
38C	00000000000000000100000000000000000000000000000000000
39C	00000000000000000000000000000000000000000000000000000
40C	00000000000000000000000000000000000000000000000000000
41C	00000000000000000100010000000001000000000000000000000
42C	01000000011000100010120010000000000021113000000000000
43C	00100000000000000000000000000000000000000000000000000
44C	00000000000000010010011000000000000000000000000000000
45C	00000000000000000000000000000000000000000000000000000
46C	01000001011111110001000010000000010000000000000000000
47C	01100011111110101110100000000000000000100000000000000
48C	11110101011111200000000000011000000002000000111010000
49C	00000000000001111010111100000000000002000000000000000
50C	00000000000000000020001000000001100162010000000000000
51C	00000000000000000000000000000000000000000000000000000
52C	00000000000000100100011000000000100000000100000000000
53C	01000000000001100021132000000000210100000300000000000
54C	00000000000000110002233210000000021020100030000000000
55C	00000000000000000001000000000000000001000000000000000
56C	00000000000000000000010000000000000001000000000000000
57C	00000000000000000001131000000000000001000100000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000000001111
	55555556666666666777777777888888888899999999990000
ITEM	34567890123456789012345678901234567890123456789123
15C	00300120000000000000000000000000000000000000000000001
16C	00001010000000000000000000000000000000000000000000001
17C	00001100000000001000000000000000000000000000000000001
18C	00000000000000000000000000000000000000000000000000001
19C	00001110000000000000000000000000010000000000000000001
20C	00000110100100000000000000000000000000000000000000001
21C	00000000001100001000000000000000000000000000000000001
22C	00000000002100001000000010000000000000000000000000001
23C	00000000000000000000000000000000000000000000000000001
24C	00000000000010000011000000000000010000000000000000001
25C	00000000000000200100100001110100000000000000000000101
26C	00000000003111221021101100010110010010000000000000000
27C	00000000002100221011100100000010010010000000000000000
28C	00000000002110211011100000010000000010000000000000000
29C	00000001111110222021111101111111121111000000000000000
30C	00000000002111211111101100000100011011000000010000
31C	00000000000000111111121112214111112211110220110015O
32C	00000000001111321111211111121111210020010000040001
33C	00000000001000000000000200000000000000000000010000
34C	00000000001000000001010000001011000000000000010010
35C	00000000001100311111101111121111110010010000020000
36C	00000000001000000010000000000000000000000000010010
37C	00000000000001000101010010101111010000000000000010
38C	00000000001000211111111111111110111000001000000010001
39C	00000000001000000010000000000011000000000000000010000
40C	00000000000000000010000000000011010000000000000010
41C	00000000100000100110000000110100110010000000000010
42C	00000000000000001111011110121211111212100032001000400
43C	00000000001100100000001000000000000000000000000000000
44C	00010000000010100111011000110100021031000000100000
45C	00000000000000000000000000001010100000000000000000
46C	00000000000000011021322212221211332112110100010010O
47C	00000000000000001100001221112010001110110000013002O0
48C	00101110000100010010100101010000031101100000130010O
49C	00000000000000011010101101221111122101200010130020O
50C	00000000000000000000101101130000012202310030241031O
51C	00000000001000011000011011001000000010000020010000O
52C	00000001011113111111111111111111111001100401001010O0
53C	00000002011111011311011012100211211211050001102001
54C	00000001000431104343111012113003311211020101104101
55C	00000000000001000000000000011010011000000000000000O
56C	00000000000001000000001000010000001000000000000000O
57C	00000000000001000010000010021020010000010000000001000

Table 8 (continued)

	ATTRIBUTE
	0000000000000000000000000000000000000000000000000000000000
	0000000001111111111222222222233333333334444444444555
ITEM	1234567890123456789012345678901234567890123456789012
58C	0000000000000000001114200000000010010100020000000000
59C	0000000000000000010013100000000100100000200000000000
60C	0000000000000000010024100000000110100000200000000000
61C	0000000000000000000000000000000000000000000000000000
62C	0000000000000000000000000000000000000000000000000000
63C	0000000000000000000000000000000000000000000000000000
64C	0000000000000010001000000000000C000000000000000000000
65C	0000000000000120001021000000000000000010001000000000
66C	0000000000000000010122100000000110100000200000000000
67C	0000000000000000100100000000000000000000000000000000
68C	0000000000000010000000000000000010000000000000000000
69C	0000000000000110001000110000000011000000000000000000
70C	0000000000000000000000000000000010010000000000000000
71C	0000000100000000000000000000000010000000000000000000
72C	0000000000000000000000000000000000000000000000000000
73C	0000000100000110000000000000000010000101000000000000
74C	0100000010000000001100011000000010013111402100000000
75C	0000000000000000001000000000010110011111100100000000
76C	0000000000000000001000000000000100001001000000000000
77C	0000000000000000001000000000000100010011000000000000

Table 8 (continued)

	ATTRIBUTE
	00000000000000000000000000000000000000000000001111
	55555556666666666777777777788888888889999999990000
ITEM	34567890123456789012345678901234567890123456789123
58C	00000000100010000100000002101001100001000000001000
59C	00000000000010000000000000110000110011000000001101200
60C	00000000100010000000000000210100000011001000011012 00
61C	00000000001111221121212111121111220011120000091101
62C	00000000001111211211211111121111120010020000000109
63C	00000000002111210111101001110100100000000000010000
64C	00000000001100011010111101110101132201090000101030 1
65C	00000000000033100342311100100101340300111000000900 0
66C	00000000001022201211200100211111110100119000000210 0
67C	00000000000121212122121022312112214041110006111301
68C	00000000000010001111122112222122131403110100610140 0
69C	00000000000011011010121102221112241302220000320090 0
70C	00000000000001000010210101140000221201910010220020 0
71C	00000000000000011110011110212020111130913000021001 00
72C	00000000001111222121112112111212121702010100210000 0
73C	00000000000111112121212221224211124231331023019012 10
74C	00000000010011002012242113324143324323110930020012 0
75C	00000000001211122132333223233233339433210310020111 0
76C	00000000000111011102232212233221233323210390140111 0
77C	00000000000111111121232222233122236623210630120111 0

[a]For data handling convenience, Attribute 96 was included in this computer-produced table. However, the zero-entries displayed for this unreliable attribute should be ignored.

[b]OAI Items 19t, 40t, 46t, 66t, and 95t are write-in items and consequently, zero-entries are displayed for these items.

APPENDIX D

RELIABILITY ESTIMATES FOR THE ATTRIBUTE-REQUIREMENT RATINGS OF THE WORK ELEMENTS IN THE OCCUPATION ANALYSIS INVENTORY

Table 9

Reliability Estimates of the Attribute-Requirement Ratings of OAI Work Elements after Five Judges with Low Individual-Group Agreement Indices were Removed

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
1	.9634	.6222	.9660	.6399
2	.9240	.4318	.9360	.4775
3	.9629	.6184	.9646	.6298
4	.9594	.5965	.9617	.6107
5	.9544	.5669	.9559	.5756
6	.8672	.2899	.8759	.3061
7	.9550	.5700	.9588	.5928
8	.9725	.6882	.9739	.7001
9	.9564	.5785	.9576	.5855
10	.9357	.4763	.9386	.4885
11	.9573	.5836	.9587	.5918
12	.9028	.3674	.9126	.3948
13	.8905	.3371	.8988	.3568
14	.9543	.5664	.9578	.5865
15	.9657	.6377	.9685	.6574
16	.9038	.3699	.9205	.4197
17	.9538	.5635	.9560	.5756
18	.9602	.6012	.9615	.6095
19	.9691	.6625	.9700	.6689
20	.9388	.4896	.9413	.5008
21	.8995	.3587	.9056	.3747
22	.9520	.5534	.9538	.5636
23	.9285	.4482	.9315	.4593
24	.8661	.2878	.8735	.3015
25	.8718	.2742	.8818	.2931
26	.9236	.4019	.9307	.4275
27	.9516	.5218	.9536	.5332
28	.8460	.2338	.8767	.2833
29	.9034	.3420	.9078	.3535
30	.9356	.4468	.9378	.4560
31	.9596	.5692	.9623	.5864
32	.8358	.2205	.8684	.2683
33	.9639	.5972	.9693	.6370
34	.9706	.6473	.9721	.6593
35	.9680	.6269	.9691	.6353
36	.9653	.6070	.9672	.6209
37	.9214	.3943	.9268	.4129
38	.8669	.2657	.8952	.3217
39	.9195	.3881	.9279	.4169

Table 9 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
40	.8968	.3256	.9052	.3466
41	.9548	.5401	.9577	.5569
42	.9692	.6363	.9702	.6442
43	.9846	.7799	.9847	.7811
44	.9686	.6312	.9689	.6336
45	.9453	.5041	.9488	.5216
46	.9286	.4334	.9346	.4569
47	.9289	.4344	.9325	.4482
48	.9425	.4911	.9548	.5543
49	.9567	.5653	.9642	.6130
50	.9057	.3611	.9214	.4082
51	.9284	.4327	.9383	.4720
52	.9081	.3677	.9170	.3939
53	.9142	.3853	.9238	.4162
54	.8926	.3283	.9087	.3692
55	.9066	.3635	.9219	.4099
56	.8881	.3183	.9057	.3609
57	.9458	.5217	.9610	.6061
58	.9222	.4255	.9429	.5081
59	.9234	.4297	.9394	.4920
60	.9236	.4303	.9340	.4694
61	.9207	.4205	.9282	.4468
62	.8885	.3323	.9097	.3863
63	.9194	.4161	.9343	.4706
64	.9530	.5589	.9583	.5898
65	.9333	.4664	.9366	.4799
66	.9575	.5849	.9604	.6026
67	.9582	.6045	.9607	.6198
68	.9247	.4503	.9388	.5055
69	.9262	.4555	.9377	.5009
70	.9315	.4756	.9333	.4828
71	.9582	.6046	.9612	.6226
72	.9008	.3770	.9068	.3934
73	.9405	.5129	.9445	.5316
74	.9563	.5933	.9580	.6035
75	.9536	.5781	.9558	.5906
76	.8736	.3155	.8877	.3451
77	.9443	.5305	.9471	.5444
78	.9216	.4394	.9315	.4753
79	.9416	.5182	.9460	.5388
80	.9419	.5192	.9462	.5399
81	.9414	.5172	.9442	.5301
82	.9174	.4254	.9238	.4471

Table 9 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
83	.9281	.4626	.9322	.4781
84	.9365	.4959	.9393	.5077
85	.9397	.5094	.9434	.5265
86	.9609	.6210	.9642	.6426
87	.8512	.2761	.8982	.3704
88	.8670	.3030	.9174	.4255
89	.7387	.1586	.8610	.2922
90	.7355	.1564	.8277	.2425
91	.9297	.4686	.9342	.4863
92	.5827	.0852	.7558	.1710
93	.8265	.2410	.8562	.2842
94	.9124	.4099	.9330	.4814
95	.8451	.2667	.8756	.3194
96	.0000	.0000	.0000	.0000
97	.7849	.1956	.8442	.2654
98	.7576	.1725	.8383	.2569
99	.2186	.0183	.6233	.0994
100	.9561	.5921	.9588	.6079
101	.7764	.1879	.8483	.2716
102	.8333	.2499	.8810	.3304
103	.1761	.0141	.5769	.0833

Table 10

Reliability Estimates of the Attribute-Requirement Ratings of OAI Work Elements by 19-20 Judges Per Attribute

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
1	.9674	.5974	.9699	.6172
2	.9261	.3851	.9371	.4270
3	.9630	.5653	.9654	.5822
4	.9637	.5704	.9655	.5835
5	.9577	.5310	.9593	.5407
6	.8794	.2672	.8865	.2808
7	.9613	.5540	.9643	.5742
8	.9765	.6755	.9778	.6881
9	.9624	.5617	.9635	.5688
10	.9381	.4309	.9408	.4429
11	.9629	.5649	.9645	.5762
12	.9089	.3328	.9164	.3540
13	.9027	.3170	.9089	.3328
14	.9576	.5306	.9606	.5492
15	.9644	.5751	.9671	.5954
16	.9128	.3435	.9273	.3895
17	.9566	.5245	.9586	.5363
18	.9612	.5535	.9626	.5629
19	.9706	.6230	.9716	.6310
20	.9252	.3822	.9311	.4033
21	.7790	.1499	.8966	.3024
22	.9590	.5390	.9603	.5474
23	.9249	.3811	.9278	.3911
24	.8773	.2633	.8834	.2747
25	.8787	.2658	.8879	.2838
26	.9287	.3944	.9346	.4169
27	.9447	.4608	.9472	.4726
28	.8456	.2150	.8760	.2611
29	.8965	.3021	.9012	.3131
30	.9358	.4214	.9379	.4301
31	.9625	.5620	.9647	.5775
32	.8393	.2070	.8652	.2429
33	.9697	.6150	.9738	.6503
34	.9737	.6495	.9749	.6603
35	.9672	.5957	.9681	.6029
36	.9663	.5895	.9681	.6029
37	.9149	.3496	.9196	.3637
38	.8822	.2725	.9032	.3182
39	.9270	.3883	.9343	.4157
40	.9024	.3161	.9101	.3360

Table 10 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
41	.9602	.5469	.9626	.5628
42	.9708	.6244	.9716	.6310
43	.9828	.7407	.9829	.7420
44	.9705	.6223	.9708	.6243
45	.9494	.4967	.9523	.5126
46	.9236	.3887	.9308	.4147
47	.9249	.3932	.9294	.4094
48	.9470	.4847	.9567	.5374
49	.9584	.5481	.9646	.5889
50	.9037	.3306	.9202	.3777
51	.9260	.3972	.9358	.4342
52	.9063	.3374	.9155	.3631
53	.9050	.3339	.9155	.3633
54	.8912	.3013	.9064	.3377
55	.9078	.3414	.9217	.3826
56	.8866	.2916	.9048	.3334
57	.9310	.4027	.9545	.5117
58	.9300	.3990	.9462	.4679
59	.9223	.3726	.9396	.4376
60	.9274	.3897	.9380	.4307
61	.9208	.3677	.9299	.3989
62	.8927	.2937	.9140	.3471
63	.9289	.3952	.9429	.4522
64	.9600	.5453	.9644	.5750
65	.9350	.4182	.9390	.4351
66	.9608	.5510	.9633	.5679
67	.9596	.5554	.9620	.5714
68	.9221	.3840	.9377	.4420
69	.9251	.3939	.9374	.4408
70	.9358	.4342	.9376	.4417
71	.9641	.5858	.9666	.6040
72	.9056	.3354	.9116	.3518
73	.9363	.4361	.9409	.4557
74	.9590	.5517	.9607	.5626
75	.9540	.5219	.9565	.5364
76	.8736	.2667	.8902	.2990
77	.9428	.4644	.9463	.4812
78	.9293	.4091	.9374	.4407
79	.9460	.4795	.9502	.5008
80	.9453	.4763	.9496	.4978
81	.9477	.4884	.9503	.5018
82	.9148	.3610	.9230	.3867
83	.9348	.4302	.9384	.4450

Table 10 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 19-20 Judges	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 19-20 Judges	Adjusted Intraclass Correlation Coefficient
84	.9402	.4529	.9431	.4657
85	.9418	.4601	.9455	.4773
86	.9634	.5808	.9666	.6039
87	.8669	.2553	.9083	.3428
88	.8786	.2758	.9213	.3813
89	.8010	.1748	.8859	.2900
90	.7607	.1433	.8394	.2158
91	.9388	.4467	.9430	.4654
92	.6768	.0993	.8043	.1778
93	.8604	.2450	.8836	.2855
94	.9229	.3864	.9404	.4539
95	.8657	.2533	.8900	.2986
96	.0000	.0000	.0000	.0000
97	.8256	.1994	.8704	.2612
98	.8094	.1827	.8688	.2585
99	.4067	.0348	.6966	.1078
100	.9556	.5313	.9586	.5490
101	.8219	.1954	.8738	.2672
102	.8408	.2175	.8843	.2868
103	.3213	.0243	.6268	.0812

APPENDIX E

TITLES AND DOT CODES OF THE JOBS INCLUDED IN THE RELIABILITY ANALYSES OF ATTRIBUTE-REQUIREMENT ESTIMATES

Sample of 88 Jobs

	DOT Code	Title
1.	003.081	Electronic Engineer (profess. & kin.)
2.	017.281	Draftsman, Detail (profess. & kin.)
3.	018.188	Surveyor (profess. & kin.)
4.	022.081	Chemist, Organic (profess. & kin.)
5.	040.081	Microbiologist (profess. & kin.)
6.	074.181	Pharmacist (profess. & kin.)
7.	075.378	Nurse, General Duty (medical ser.)
8.	132.038	Editor, Sports (print. & pub.)
9.	141.081	Illustrator (profess. & kin.)
10.	143.382	Photographer, Finish (amuse. & rec.)
11.	159.228	Instructor, Bridge
12.	160.188	Accountant (profess. & kin.)
13.	210.388	Bookkeeping-Machine Operator I (clerical)
14.	313.381	Cook (hotel & rest.)
15.	355.878	Nurse Aide (medical ser.)
16.	601.280	Tool-And-Die Maker (mach. shop)
17.	620.281	Automobile Mechanic (auto ser.)
18.	680.885	Drawing-Frame Tender (textile)
19.	682.885	Spinner, Frame (asbestos prod.; textile)
20.	804.281	Sheet-Metal Worker (found.)
21.	003.181	Electronic Technician
22.	001.281	Draftsman, Mechanical
23.	019.281	Engineering Aide II
24.	020.188	Programmer, Business
25.	045.088	Psychologist
26.	070.108	General Practitioner
27.	078.368	Dental Hygienist
28.	078.381	Medical Laboratory Assistant
29.	079.378	Nurse, Licensed Practical
30.	079.378	Dental Assistant
31.	091.228	Teacher, Secondary School
32.	163.118	Manager, City Circulation
33.	185.168	Manager, Retail Food Store
34.	187.168	Manager, Theater
35.	195.108	Case Worker
36.	210.388	Audit Clerk
37.	212.368	Teller
38.	213.582	Key Punch Operator
39.	219.388	General Office Clerk
40.	250.358	Salesman, Real Estate
41.	332.271	Cosmetologist
42.	355.878	Cottage Parent
43.	372.868	Corrections Officer
44.	373.884	Fire Fighter
45.	375.268	Patrolman
46.	379.168	Fish and Game Warden

	DOT Code	Title
47.	600.280	Machinist I
48.	609.885	Production-Machine Operator
49.	625.281	Diesel Mechanic
50.	681.885	Yarn Winder
51.	683.280	Loom Fixer
52.	720.281	Television Service and Repairman
53.	807.381	Automobile Body Repairman
54.	812.884	Welder, Combination
55.	824.281	Electrician
56.	828.281	Electronics Mechanic
57.	861.381	Bricklayer
58.	862.381	Pipe Fitter, Maintenance
59.	922.887	Order Filler
60.	222.587	Shipping Clerk II
61.	405.181	Tobacco Grower
62.	040.081	Wood Technologist
63.	120.108	Clergyman
64.	144.081	Artist (painter)
65.	152.048	Musician (instrumental)
66.	130.088	Author (literary writer)
67.	100.168	Librarian
68.	223.367	Stock Clerk
69.	320.137	Motel Manager
70.	092.228	Teacher, Elementary School
71.	729.884	Electrical Control Assembler
72.	029.381	Chemical Laboratory Technician
73.	860.281	Maintenance Carpenter
74.	186.168	Branch Bank Manager
75.	186.138	Assistant Branch Bank Manager
76.	201.368	Secretary
77.	203.588	Typist
78.	206.388	File Clerk
79.	250.258	Insurance Salesman
80.	001.081	Building Designer
81.	023.081	Physicist
82.	110.118	Corporation Lawyer
83.	162.158	Purchasing Agent
84.	152.028	Music Teacher
85.	012.288	Industrial Engineering Technician
86.	637.281	Refrigeration Mechanic
87.	219.488	Accounting Clerk
88.	180.118	General Manager, Farm

Sample of 215 Jobs[a]

	DOT Code	Title
1.	003.081	Electronic Engineer (profess. & kin.)
2.	017.281	Draftsman, Detail (profess. & kin.)
3.	018.188	Surveyor (profess. & kin.)
4.	022.081	Chemist, Organic (profess. & kin.)
5.	040.081	Microbiologist (profess. & kin.)
6.	074.181	Pharmacist (profess. & kin.)
7.	075.378	Nurse, General Duty (medical ser.)
8.	132.038	Editor, Sports (print. & pub.)
9.	141.081	Illustrator (profess. & kin.)
10.	143.382	Photographer, Finish (amuse. & rec.)
11.	159.228	Instructor, Bridge
12.	160.188	Accountant (profess. & kin.)
13.	210.388	Bookkeeping-Machine Operator I (clerical)
14.	313.381	Cook (hotel & rest.)
15.	355.878	Nurse Aide (medical ser.)
16.	601.280	Tool-And-Die Maker (mach. shop)
17.	620.281	Automobile Mechanic (auto ser.)
18.	680.885	Drawing-Frame Tender (textile)
19.	682.885	Spinner, Frame (asbestos prod.; textile)
20.	804.281	Sheet-Metal Worker (found.)
21.	003.181	Electronic Technician
22.	001.281	Draftsman, Mechanical
23.	019.281	Engineering Aide II
24.	020.188	Programmer, Business
25.	045.088	Psychologist
26.	070.108	General Practitioner
27.	078.368	Dental Hygienist
28.	078.381	Medical Laboratory Assistant
29.	079.378	Nurse, Licensed Practical
30.	079.378	Dental Assistant
31.	091.228	Teacher, Secondary School
32.	163.118	Manager, City Circulation
33.	185.168	Manager, Retail Food Store
34.	187.168	Manager, Theater
35.	195.108	Case Worker
36.	210.388	Audit Clerk
37.	212.368	Teller
38.	213.582	Key Punch Operator
39.	219.388	General Office Clerk
40.	250.358	Salesman, Real Estate
41.	332.271	Cosmetologist
42.	355.878	Cottage Parent
43.	372.868	Corrections Officer
44.	373.884	Fire Fighter
45.	375.268	Patrolman
46.	379.168	Fish and Game Warden

	DOT Code	Title
47.	600.280	Machinist I
48.	609.885	Production-Machine Operator
49.	625.281	Diesel Mechanic
50.	681.885	Yarn Winder
51.	683.280	Loom Fixer
52.	720.281	Television Service and Repairman
53.	807.381	Automobile Body Repairman
54.	812.884	Welder, Combination
55.	824.281	Electrician
56.	828.281	Electronics Mechanic
57.	861.381	Bricklayer
58.	862.381	Pipe Fitter, Maintenance
59.	922.887	Order Filler
60.	222.587	Shipping Clerk II
61.	405.181	Tobacco Grower
62.	040.081	Wood Technologist
63.	120.108	Clergyman
64.	144.081	Artist (painter)
65.	152.048	Musician (instrumental)
66.	130.088	Author (literary writer)
67.	100.168	Librarian
68.	223.367	Stock Clerk
69.	320.137	Motel Manager
70.	092.228	Teacher, Elementary School
71.	729.884	Electrical Control Assembler
72.	029.381	Chemical Laboratory Technician
73.	860.281	Maintenance Carpenter
74.	186.168	Branch Bank Manager
75.	186.138	Assistant Branch Bank Manager
76.	201.368	Secretary
77.	203.588	Typist
78.	206.388	File Clerk
79.	250.258	Insurance Salesman
80.	001.081	Building Designer
81.	023.081	Physicist
82.	110.118	Corporation Lawyer
83.	162.158	Purchasing Agent
84.	152.028	Music Teacher
85.	012.288	Industrial Engineering Technician
86.	637.281	Refrigeration Mechanic
87.	219.488	Accounting Clerk
88.	180.118	General Manager, Farm
89.	002.081	Maintainability Design Engineer (aerospace)
90.	010.168	Production Engineer (petrol. production)
91.	011.281	Spectroscopist (profess. & kin.)
92.	029.281	Laboratory Tester I (any ind.)
93.	041.281	Lab Technician, Microbiology
94.	050.088	Market-Research Analyst I (profess. & kin.)
95.	102.168	Curator, Natural History Museum (museum)

	DOT Code	Title
96.	152.048	Bugler (amuse. & rec.)
97.	166.168	Personnel Representative (air trans.)
98.	169.168	Administrative Assistant (any ind.)
99.	187.168	Executive Housekeeper (hotel & rest.)
100.	189.118	Manager, Industrial Organization (any ind.)
101.	193.282	Radio Operator (light, heat, & power)
102.	213.582	Payroll Clerk (hosiery)
103.	219.368	Collection Clerk
104.	221.388	Production Clerk II (clerical)
105.	222.388	Label Processor
106.	222.588	Traffic Clerk (clerical)
107.	223.588	Tallyman (clerical)
108.	249.368	Order Clerk II (clerical)
109.	249.388	Authorizer, Regular Accounts (clerical)
110.	263.358	Salesperson, Men's Furnishings (ret. tr.)
111.	283.458	Silver Saleslady (ret. tr.)
112.	289.358	Salesperson, Book (ret. tr.)
113.	316.884	Meat Cutter (whole. tr.)
114.	329.874	Dock Attendant (water trans.)
115.	363.887	Glove Former (clean, dye & press; glove & mit)
116.	376.868	House Officer (hotel & rest.)
117.	389.887	Light Cleaner (textile)
118.	412.864	Egg Room Supervisor (agric.)
119.	431.884	Fisherman (Purse Seine) (fish.)
120.	441.384	Forester Aide (gov. ser.)
121.	466.887	Livestock Caretaker, Yard-Or-In-Transit (any ind.)
122.	512.885	First Helper, Electric Furnace (found.)
123.	519.887	Foundry Worker, General (found.)
124.	520,885	Chipping Machine Operator (slaught. & meat pack.)
125.	521.885	Centrifuge Operator (can. & preserv.)
126.	521.885	Sorting-Machine Operator (can. & preserv.)
127.	522.887	Leadman (can. & preserv.)
128.	525.884	Fish Cleaner (can. & preserv.; fish.)
129.	526.782	Cook, Kettle (can. & preserv.)
130.	529,687	Sorter, Agricultural Produce (agric.; can. & preserv.; whole. tr.)
131.	529.885	Noddle Maker (macaroni & rel. prod.)
132.	529,887	Laborer (slaught. & meat pack.)
133.	541.885	Screenman (coke prod.)
134.	550.884	Dye Weigher (any ind.)
135.	551.885	Centrifuge Operator (paint. & varn.)
136.	553.885	Flaker Operator (chem.)
137.	553.885	Drier Operator (glue)
138.	557.782	Extruder Operator (fabric. plastic prod.)
139.	558.138	Manager, Soap and Synthetics and Glycerin (soap)
140.	559.132	Foreman, Record Press (phonograph)
141.	559.782	Acid Maker (paper & pulp)
142.	570.885	Tubemill Operator (cement)
143.	573.782	Kiln Burner (brick & tile)

	DOT Code	Title
144.	579.687	Selector (glass mfg.)
145.	582.885	Conditioner Tender (textile; hosiery)
146.	583.885	Brim-And-Crown Presser (hat & cap)
147.	585.885	Trimmer (knit goods)
148.	600.380	Machine Set-Up Operator (mach. shop)
149.	603.782	Honing Machine Set-Up Operator, Tool (mach. shop)
150.	604.280	Turret-Lathe Set-Up Operator, Tool (mach. shop)
151.	611.782	Pressman (forging)
152.	615.782	Punch-Press Operator I (any ind.)
153.	617.885	Punch-Press Operator II (any ind.)
154.	619.380	Fabricator A-Cutting Department (any ind.)
155.	628.884	Reed Man (textile)
156.	630.781	Propellant-and-Gas Mechanic (aircraft mfg.)
157.	641.885	Sealing-Machine Operator (paper goods)
158.	661.281	Patternmaker, Wood (found.)
159.	663.885	Veneer Clipper (veneer & plywood)
160.	667.885	Cut-Off Sawyer Log (paper & pulp; sawmill)
161.	683.782	Weaver, Narrow Fabrics (asbestos prod.; narrow fabrics)
162.	689.885	Braiding-Machine Operator (asbestos prod.; narrow fab.)
163.	689.885	Garnetter (felt goods; house furn.; matt. & bedsprings; waste & batting)
164.	690.885	Filler (boot & shoe)
165.	692.280	Maintenance Mechanic, Wire Department (electronics)
166.	693.381	Model Maker I (aircraft mfg.)
167.	699.887	Oiler I (any ind.)
168.	700.884	Polisher (jewelry)
169.	706.884	Vending Machine Assembler (coin mach.)
170.	709.884	Tube Finisher and Assembler "A" (aircraft mfg.)
171.	710.884	Solderer (inst. & app.)
172.	712.381	Dental Laboratory Technician (medical ser.)
173.	716.884	Assembler (electronics)
174.	721.884	Heavy Assembler (elec. equip.)
175.	723.132	Factory Supervisor (light. fix.)
176.	726.884	Boat Loader (electronics)
177.	731.885	Assembler V (tire setter, car) (toys & games)
178.	732.884	Formica Trim Assembler (sports equip.)
179.	733.130	Foreman, Plating and Point Assembly (pen & pencil)
180.	733.381	Typesetter (pen & pencil)
181.	739.884	Assembler, Metal Furniture (furn.)
182.	749.884	Putty Glazer (any ind.)
183.	750.887	Tire Mounter (fabric. prod., n.e.c.)
184.	762.884	Glueman (woodworking)
185.	763.884	Frame Maker (furn.)
186.	769.687	Inspector-Packer
187.	774.384	Finish Inspector-Instructor (pottery & porc.)
188.	777.381	Patternmaker, Plaster (aircraft mfg.)
189.	780.884	Cushion Man (furn.)
190.	780.884	Upholsterer II (furn.)
191.	786.782	Sewing Machine Operator, Regular Equipment (garment)

	DOT Code	Title
192.	787.782	Hemmer (any ind.)
193.	788.887	Tapes Top Line of Quarters (boot & shoe)
194.	799.381	Upholsterer (ship & boat bldg. & rep.)
195.	801.381	Aircraft Mechanic, Rigging and Controls (aircraft mfg.)
196.	806.781	Air-Conditioning Installer, General (aircraft mfg.)
197.	809.131	Yard Superintendent (ship & boat bldg. & rep.)
198.	814.884	Can Solderer (electronics)
199.	828.281	Electrician A (mach. shop)
200.	850.883	Scraper Operator (any ind.)
201.	859.883	Operating Engineer II (const.)
202.	861.381	Lip-and-Gate Builder and Oiler Maintenance Man (glass mfg.)
203.	862.884	Soft-Water Serviceman (bus. ser.)
204.	869.134	Foreman (Finish Flooring) (trans. equip.)
205.	911.873	Dockmaster (water trans.)
206.	913.883	Chauffeur (any ind.)
207.	920.885	Packager, Machine (any ind.)
208.	920.887	Shipping Processor (aircraft mfg.)
209.	921.883	Locomotive Crane Operator (any ind.)
210.	929.887	Material Handler (whole. tr.)
211.	941.488	Log Scaler (logging; veneer & pulp; and sawmill)
212.	950.782	Stationary Engineer (any ind.)
213.	952.262	Crew Leader-Power House (any ind.)
214.	959.387	Patrolman (light, heat, & power)
215.	970.381	Checker-Packager (photo. process. & finish.)

[a]The sample of 88 jobs is included in this sample of 215 jobs.

APPENDIX F

RELIABILITY COEFFICIENTS OF ATTRIBUTE-REQUIREMENT ESTIMATES FOR JOBS

Table 11

Reliability Coefficients of 102 Attribute-Requirement Estimates for 215 Jobs (Based on 2 Sets of OAI Ratings)[a]

Attribute Number	Unadjusted Correlation Coefficient for 2 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 2 Raters	Adjusted Intraclass Correlation Coefficient
1	.8702	.7702	.8723	.7736
2	.8335	.7146	.8413	.7261
3	.8453	.7320	.8468	.7343
4	.8578	.7510	.8597	.7539
5	.8960	.8116	.8993	.8169
6	.8174	.6911	.8242	.7010
7	.8204	.6955	.8322	.7127
8	.9411	.8887	.9436	.8933
9	.8829	.7904	.8884	.7992
10	.8592	.7532	.8614	.7565
11	.8015	.6688	.8096	.6801
12	.8427	.7281	.8546	.7461
13	.7791	.6381	.7863	.6479
14	.9042	.8251	.9071	.8299
15	.8991	.8166	.9001	.8183
16	.9180	.8484	.9213	.8540
17	.9160	.8450	.9182	.8487
18	.9200	.8518	.9217	.8548
19	.9303	.8697	.9319	.8724
20	.9324	.8733	.9339	.8761
21	.9122	.8385	.9126	.8392
22	.9157	.8445	.9158	.8446
23	.9253	.8610	.9250	.8604
24	.9247	.8599	.9250	.8605
25	.7604	.6134	.7799	.6392
26	.8470	.7346	.8577	.7509
27	.9135	.8408	.9165	.8459
28	.7611	.6144	.7774	.6359
29	.7477	.5971	.7466	.5956
30	.8728	.7743	.8753	.7783
31	.9194	.8508	.9217	.8547
32	.9044	.8256	.9070	.8298
33	.9240	.8588	.9259	.8621
34	.9367	.8809	.9397	.8863
35	.9331	.8746	.9362	.8800
36	.9401	.8869	.9417	.8897
37	.9228	.8567	.9243	.8592
38	.8627	.7585	.8650	.7621
39	.9171	.8470	.9187	.8496
40	.9199	.8517	.9211	.8537

Table 11 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 2 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 2 Raters	Adjusted Intraclass Correlation Coefficient
41	.9283	.8662	.9293	.8680
42	.9272	.8643	.9272	.8642
43	.8933	.8072	.8948	.8096
44	.9179	.8483	.9180	.8484
45	.8261	.7037	.8269	.7049
46	.8417	.7267	.8423	.7276
47	.8238	.7004	.8240	.7007
48	.8072	.6767	.8120	.6836
49	.8342	.7156	.8362	.7185
50	.8276	.7058	.8321	.7125
51	.8202	.6951	.8251	.7022
52	.8783	.7831	.8779	.7823
53	.8706	.7708	.8705	.7707
54	.8589	.7528	.8583	.7518
55	.8302	.7097	.8322	.7126
56	.8460	.7331	.8456	.7325
57	.8125	.6842	.8270	.7051
58	.7852	.6463	.7911	.6544
59	.8173	.6910	.8212	.6967
60	.8338	.7150	.8452	.7319
61	.8546	.7461	.5893	.7534
62	.8135	.6857	.8179	.6918
63	.8127	.6845	.8129	.6847
64	.8312	.7112	.8363	.7187
65	.9090	.8333	.9097	.8344
66	.9186	.8494	.9190	.8501
67	.8946	.8094	.8951	.8102
68	.7734	.6306	.7872	.6491
69	.8266	.7045	.8330	.7138
70	.9196	.8513	.9203	.8523
71	.8743	.7767	.8761	.7795
72	.8217	.6974	.8224	.6983
73	.9088	.8328	.9091	.8334
74	.9283	.8662	.9317	.8722
75	.9224	.8559	.9240	.8587
76	.8485	.7368	.8552	.7471
77	.9050	.8264	.9063	.8287
78	.8987	.8160	.9032	.8234
79	.9318	.8723	.9329	.8742
80	.9249	.8603	.9253	.8609
81	.8458	.7328	.8481	.7362
82	.8936	.8076	.8968	.8129
83	.8961	.8117	.8965	.8124

Table 11 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 2 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 2 Raters	Adjusted Intraclass Correlation Coefficient
84	.9104	.8355	.9107	.8361
85	.9321	.8728	.9340	.8762
86	.8991	.8167	.9013	.8204
87	.8721	.7732	.8756	.7787
88	.8530	.7436	.8544	.7459
89	.7812	.6409	.7885	.6509
90	.8641	.7607	.8647	.7616
91	.9258	.8618	.9256	.8614
92	.9163	.8455	.9172	.8471
93	.8327	.7133	.8339	.7151
94	.9043	.8253	.9054	.8271
95	.9349	.8777	.9358	.8794
97	.8755	.7786	.8755	.7786
98	.8853	.7941	.8859	.7951
99	.8888	.7999	.8929	.8064
100	.9237	.8583	.9245	.8596
101	.9163	.8456	.9163	.8455
102	.9126	.8392	.9163	.8455
103	.8940	.8083	.9048	.8262

[a]Attribute Item 96, Moral Values, was eliminated from the analysis because of an unacceptably low reliability.

Table 12

Reliability Coefficients of 102 Attribute-Requirement Estimates for 88 Jobs (Based on 3 Sets of OAI Ratings)[a]

Attribute Number	Unadjusted Correlation Coefficient for 3 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 3 Raters	Adjusted Intraclass Correlation Coefficient
1	.9107	.7726	.9143	.7806
2	.8819	.7134	.8888	.7271
3	.8975	.7449	.9019	.7540
4	.8937	.7371	.8981	.7461
5	.9341	.8254	.9365	.8310
6	.8742	.6984	.8820	.7136
7	.8485	.6512	.8586	.6692
8	.9399	.8390	.9403	.8399
9	.8919	.7333	.8960	.7417
10	.8831	.7158	.8860	.7214
11	.8244	.6101	.8332	.6249
12	.8768	.7035	.8856	.7208
13	.8584	.6689	.8649	.6809
14	.9492	.8618	.9516	.8676
15	.9522	.8691	.9541	.8738
16	.8830	.7156	.8865	.7225
17	.8952	.7400	.8992	.7484
18	.8932	.7360	.8972	.7442
19	.9081	.7671	.9086	.7682
20	.9244	.8030	.9255	.8054
21	.9222	.7981	.9238	.8017
22	.9161	.7846	.9166	.7855
23	.9254	.8052	.9252	.8048
24	.9221	.7978	.9240	.8020
25	.7411	.4883	.7520	.5027
26	.8591	.6701	.8637	.6787
27	.8660	.6829	.8698	.6902
28	.7247	.4674	.7461	.4948
29	.7793	.5406	.7850	.5490
30	.8685	.6876	.8704	.6913
31	.8952	.7400	.8974	.7445
32	.8288	.6174	.8294	.6184
33	.8952	.7401	.8964	.7425
34	.9164	.7852	.9176	.7877
35	.9065	.7636	.9079	.7666
36	.9243	.8027	.9245	.8032
37	.8974	.7446	.8976	.7450
38	.8032	.5763	.8056	.5801
39	.8643	.6798	.8650	.6810
40	.8752	.7005	.8754	.7007

Table 12 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 3 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 3 Raters	Adjusted Intraclass Correlation Coefficient
41	.8876	.7246	.8885	.7264
42	.9263	.8073	.9264	.8076
43	.9111	.7735	.9122	.7759
44	.9489	.8608	.9492	.8617
45	.8592	.6705	.8634	.6781
46	.8722	.6946	.8789	.7076
47	.8619	.6754	.8696	.6896
48	.8547	.6622	.8627	.6768
49	.8825	.7146	.8874	.7242
50	.8627	.6768	.8691	.6887
51	.8765	.7028	.8846	.7188
52	.9203	.7938	.9214	.7962
53	.9171	.7867	.9188	.7905
54	.8993	.7485	.9018	.7538
55	.8061	.5808	.8181	.5998
56	.8951	.7399	.8998	.7495
57	.6965	.4335	.7174	.4583
58	.8151	.5950	.8247	.6106
59	.8481	.6505	.8550	.6628
60	.8583	.6688	.8659	.6829
61	.8441	.6435	.8497	.6533
62	.8716	.6935	.8781	.7060
63	.8788	.7073	.8834	.7164
64	.8814	.7124	.8872	.7238
65	.9162	.7848	.9177	.7880
66	.9474	.8573	.9487	.8605
67	.8627	.6769	.8676	.6859
68	.8023	.5749	.8164	.5971
69	.8654	.6819	.8727	.6956
70	.9079	.7666	.9094	.7699
71	.9318	.8199	.9343	.8258
72	.8506	.6550	.8542	.6613
73	.9049	.7604	.9068	.7643
74	.8996	.7492	.9026	.7555
75	.8902	.7299	.8932	.7361
76	.7869	.5517	.7963	.5659
77	.9156	.7833	.9176	.7877
78	.8416	.6390	.8471	.6488
79	.9152	.7825	.9165	.7854
80	.9115	.7745	.9119	.7752
81	.8076	.5832	.8127	.5912
82	.8271	.6146	.8318	.6223
83	.8685	.6876	.8709	.6922

Table 12 (continued)

Attribute Number	Unadjusted Correlation Coefficient for 3 Raters	Unadjusted Intraclass Correlation Coefficient	Adjusted Correlation Coefficient for 3 Raters	Adjusted Intraclass Correlation Coefficient
84	.8597	.6714	.8604	.6726
85	.9218	.7972	.9238	.8016
86	.9140	.7800	.9174	.7873
87	.7663	.5222	.7739	.5329
88	.7873	.5524	.7927	.5603
89	.6495	.3818	.6672	.4006
90	.8389	.6346	.8410	.6382
91	.9253	.8050	.9247	.8038
92	.9125	.7766	.9128	.7773
93	.8744	.6988	.8750	.7001
94	.8741	.6983	.8765	.7029
95	.9073	.7653	.9081	.7672
97	.8633	.6780	.8632	.6778
98	.8438	.6430	.8466	.6479
99	.9050	.7606	.9083	.7675
100	.9410	.8417	.9421	.8444
101	.9143	.7805	.9141	.7800
102	.8719	.6941	.8761	.7021
103	.8246	.6104	.8359	.6293

[a]Attribute Item 96, Moral Values, was eliminated from the analysis because of an unacceptably low reliability.

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